November 1, 2010
Cardno ERI 08115503.W01

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Dr. Ann Chang
California Regional Water Quality Control Board
Los Angeles Region
320 West 4th Street, Suite 200
Los Angeles, California 90013

SUBJECT **Work Plan for Site Assessment Activities**
Former ExxonMobil Jalk Fee Property
10607 Norwalk Boulevard
Santa Fe Springs, California
CRWQCB-LAR Case No. 0203; Site I.D. No. 1848000

Dr. Chang:

At the request of ExxonMobil Environmental Services (EMES), on behalf of ExxonMobil Production Company (ExxonMobil), Cardno ERI has prepared this *Work Plan for Site Assessment Activities* (Work Plan) for the above-referenced site (Plate 1). The purpose of the Work Plan is to delineate the lateral and vertical extents of dissolved phase HVOCs, as required by the California Regional Water Quality Control Board-Los Angeles Region (CRWQCB-LAR) in its letter dated August 24, 2010 (Appendix A). The dissolved phase HVOCs measured in the existing monitoring wells at the subject site appear to be sourced from a release at the adjacent Continental Heat Treating (CHT) facility and the regionally extensive Omega Chemical Superfund Plume. The proposed work consists of the installation of three groundwater monitoring wells to delineate the vertical, crossgradient and upgradient extents of dissolved phase HVOCs (Plate 2).

On behalf of CHT, Environmental Support Technologies, Inc. submitted a work plan dated March 4, 2002, for the installation of groundwater monitoring wells on CHT's property (Appendix B). The work plan was approved by the CRWQCB-LAR in its letter dated April 16, 2002 and ordered to be implemented in its letter dated May 5, 2010. As the CHT facility is located directly downgradient of the subject site, it is not necessary or cost effective for ExxonMobil to duplicate efforts and install additional downgradient groundwater monitoring wells on the CHT facility

property. Therefore, it is proposed that upon installation of the wells the CRWQCB-LAR has required CHT to install, coordinated groundwater monitoring and sampling be performed between ExxonMobil and CHT.

SITE DESCRIPTION

Former ExxonMobil Jalk Fee is located at 10607 Norwalk Boulevard, in the city of Santa Fe Springs, California. The site is 8.8 acres in size and has contained multiple industrial businesses since redevelopment into an industrial park in 2003. The surrounding areas consist mainly of industrial facilities. The CHT facility, located contiguous to the south of the site, has an active environmental case with the CRWQCB-LAR for the release of HVOCs, including PCE and TCE, associated with the use of a degreaser at the facility (Plate 2) (ARCADIS, 2009).

Both the former Jalk Fee property and the CHT facility are located within the Omega Chemical Superfund plume, an area more than four miles long, with documented regional HVOC concentrations in groundwater relating to historical industrial activities in the cities of Santa Fe Springs and Whittier. The contaminants of concern relating to the Omega Chemical Superfund Site are HVOCs, including PCE and TCE (CH2MHILL, 2010).

BACKGROUND

The site contained oil production facilities from the 1920s to the 1990s, and the oil field facilities were removed in the 1990s. The documented contaminants of concern at the site related to oil field operations were hydrocarbons and metals. ExxonMobil has not identified records that show it used HVOCs at the Jalk Fee property (ARCADIS, 2009). As acknowledged in CRWQCB-LAR's letter dated June 23, 2010 to CHT, "the adjacent Jalk Fee property was used for oil production operations and no primary sources(s) of PCE contamination have been identified."

In 1997, Alton Geoscience completed site assessment activities to delineate the distribution of previously identified HVOC- and hydrocarbon-containing soil in the vicinity of the southeastern property boundary and eastern central portion of the site. At the completion of the assessment work, a fate and transport model was completed, which indicated that the concentrations of the residual hydrocarbons left in place posed no risk to groundwater (Alton Geoscience, 1997). In June 1998, Alton Geoscience completed remedial excavation activities of HVOC- and hydrocarbon-containing soil in three areas along the southern property boundary and eastern central portion of the site (Alton Geoscience, 1998). Based on the results of the soil remediation activities and the fate and transport model, the CRWQCB-LAR issued a closure letter for soil on March 1, 1999.

In November 2000, TRC Alton Geoscience (TRC) completed additional remedial excavation activities in seven areas throughout the former Jalk Fee property, to remove hydrocarbon-containing soil as directed by the Santa Fe Springs Fire Department (SFSFD) to facilitate planned redevelopment of the site. Confirmation soil samples collected from the post-excavation areas indicated that cleanup goals set by the SFSFD had been achieved. An exposure assessment was also completed, which indicated that no additional mitigation was warranted to protect human health prior to initiating site development activities (TRC, 2000). The SFSFD and the CRWQCB-LAR issued no further action letters for soil in directives dated December 26, 2000 and March 5, 2001, respectively. The CRWQCB-LAR letter stated "we have determined that the chlorinated and petroleum hydrocarbons contaminated soils have been remediated to levels satisfactory to this Regional Board and protective of groundwater."

In 2003, the property was paved and redeveloped as an industrial business park.

Based upon the presence of HVOCs in groundwater, the CRWQCB-LAR required continued groundwater monitoring at the site, which has occurred for the past nine years, utilizing wells MMW-04 and MMW-05. Well MMW-3 was destroyed in 2001 to facilitate redevelopment of the property. The results of the monitoring have indicated no detections of benzene or hydrocarbons for the two wells for the past seven sampling events, and several requests for no further action were submitted on behalf of ExxonMobil (ARCADIS, 2009).

GEOLOGY AND HYDROGEOLOGY

According to TRC's *Site Closure Report and Risk Assessment* dated November 28, 2000, the site is located within the Santa Fe Springs Oil Field on the Santa Fe Springs Plain, which is part of the Montebello Forebay non-pressure area of the Central Basin. Groundwater is found throughout the region under unconfined conditions in the Recent Alluvium and in the underlying Exposition Aquifer. Within the Santa Fe Springs Oil Field, the upper 100 feet of sediments consist predominantly of permeable sands, although the upper 15 feet of sediments have a higher silt and clay content and lower permeability. Assessment activities indicate that the soil beneath the site consists of silty sand, sandy silt, and silt from grade to 40 feet bgs, with interbeds of sand between 10 and 20 feet bgs. Sand is generally present between 40 and 100 feet bgs (TRC, 2000).

The first regional groundwater-bearing zone in the site vicinity is the Exposition Aquifer, which is encountered at approximately 100 feet bgs. This aquifer is approximately 75 to 100 feet thick, and is underlain by a 50 foot thick aquiclude, beneath which is the Gage aquifer [California Department of Water Resources (CDWR), 1961]. During the 2009 annual groundwater monitoring and sampling event performed on September 22, 2009, the depth to

groundwater in the site wells ranged from 91.00 to 92.10 feet below TOC. The results of historical groundwater monitoring activities conducted until the abandonment of well MMW-3 in 2001, indicated that the groundwater flow direction beneath the site had generally been to the south/southwest (ARCADIS, 2009). First groundwater beneath the site is interpreted to be within the Exposition Aquifer (CDWR, 1961).

Proposed Work

The primary constituents of concern in groundwater are HVOCs including PCE and TCE. The highest concentrations of PCE and TCE have been reported for well MMW-05, located along the southern property boundary (Appendix C) (ARCADIS, 2009).

Therefore, to delineate the vertical extent of dissolved phase HVOCs in the source area, Cardno ERI proposes to install one groundwater monitoring well along the southern property boundary (Plate 2). To delineate the lateral extent of dissolved phase HVOCs, Cardno ERI proposes to install one groundwater monitoring well upgradient of well MMW-05 and one well crossgradient to the east of well MMW-05 (Plate 2).

Existing monitoring well MMW-04 will be used to delineate the lateral extent of dissolved phase HVOCs associated with the CHT release to the west of well MMW-05 (Plate 2). Although concentrations of PCE have been detected in well MMW-04, these concentrations appear to be consistent with regional PCE concentrations as a result of the Omega Superfund Site. According the CH2MHill *Final Feasibility Study, Omega Chemical Corporation Superfund Site (Study)* dated August 2010, the subject site is located downgradient of the Omega Superfund Site. A composite PCE distribution map included in the *Study* indicated that groundwater beneath the Jalk Fee property is anticipated to contain between 5 and 100 ug/L of PCE as a result of the Omega Superfund Site, with PCE concentrations increasing from west to east across the property, toward the center of the Omega plume (Appendix D) (CH2MHILL, 2010).

A downgradient monitoring well is not proposed at this time, since the property adjacent to the south of the site has also been ordered by the CRWQCB-LAR to conduct well installation and monitoring activities which will fulfill the CRWQCB-LAR's requirement for downgradient assessment.

Pre-Field Activities

Cardno ERI personnel will visit the site to check for obstructions and to mark the proposed locations. Underground Service Alert and the CRWQCB-LAR will be notified at least 48 hours prior to the onset of field activities. An encroachment permit will be obtained from the City of Santa Fe Springs for the well in the public right of way.

Drilling and Sampling Activities

Three borings will be drilled using a drill rig equipped with 12-inch diameter hollow stem augers until a competent aquiclude is encountered, which is estimated to occur at a depth of 175 feet bgs in the site vicinity. Soil samples will be collected at 5-foot intervals to total depth for field screening and geologic logging purposes. To evaluate the vertical profile of dissolved phase HVOCs, discrete groundwater samples will be collected during drilling and analyzed on site by a mobile laboratory for VOCs using EPA Method 8260B. This data will be used to determine the appropriate depths at which to screen the multiple monitoring wells. Discrete groundwater samples will be collected at depths of 105, 140 and at the base of the first saturated zone (estimated at 175 feet bgs).

To collect the discrete groundwater samples, a SimulProbe® will be used. The SimulProbe® is an apparatus designed for simultaneous subsurface collection of soil and groundwater. The sampler is driven into unconsolidated to semi-consolidated material using conventional wire line hammer technology. The sliding drive shoe assembly is designed with a series of movable positions that facilitate simultaneously sampling for fluids and soil. Ports located at the bottom of the device allow for continuous fluid sampling. Fluids and solids are kept completely separate within the sampling assembly. A one-way valve at the base of the fluid container prevents backflow of fluids from the container after the fluid sample is collected.

During deployment and retrieval of the SimulProbe® in the borehole the one-way valve is pneumatically sealed to prevent borehole fluids from entering the chamber and cross contaminating the fluid sample obtained from the formation. Pneumatic sealing is accomplished by passing either nitrogen or helium gas through a plastic pressurization line connected to the top of the SimulProbe® water canister. Groundwater sampling is accomplished using a stainless steel canister module for pneumatically pressured and containerized water samples, and a peristaltic pump for direct discharge at the ground surface, or by using a traditional rod bailer combination.

Well Completion Activities

Each boring will be completed as a groundwater monitoring well, using 2-inch diameter, Schedule 40 PVC casing. Cardno ERI will evaluate the results of the groundwater sample analyses obtained during drilling and, if HVOC concentrations are reported for a sample, the well will be nested with additional casing(s) installed and screened across the interval(s) where the samples were collected. If HVOCs are not detected, a well will not be installed across that interval. Dependant upon groundwater sample results, a minimum of one well casing and a maximum of three well casings will be installed in each boring. For the casing screened across the groundwater interface, estimated at 95 feet bgs, the screened interval will be 10 feet above to 20 feet below the groundwater interface. The deeper casings will be installed with 10 feet of screen across the interval at which the discrete groundwater sample was collected (Plate 3).

The screened intervals for each well may be modified in the field based upon the lithology and groundwater depth encountered during drilling. The proposed groundwater monitoring wells will be surveyed in accordance with AB2886 and will be incorporated into the groundwater monitoring and sampling program for the site.

The procedures for drilling, sampling, decontamination and well construction are described in the field protocol contained in Appendix E. The fieldwork will be conducted under the advisement of a State of California professional geologist and in accordance with applicable regulatory guidelines.

Laboratory Analyses and Results

Select soil samples will be submitted for analysis to a fixed base state-certified analytical laboratory. The samples will be analyzed for VOCs by EPA Method 8260B. Discrete groundwater samples will be analyzed on site by a mobile laboratory for VOCs by EPA Method 8260B.

Waste Management Plan

The soil and decontamination water generated during drilling activities will be temporarily stored on site in DOT-approved, 55-gallon drums. Soil cuttings will be transported to TPST Soil Recyclers of California's approved facility in Adelanto, California, for recycling. Decontamination water will be transported to Crosby & Overton's approved facility in Long Beach, California, for disposal. Copies of the manifests for disposal of soil and water will be included in the report.

Site Safety Plan

All fieldwork will be performed in accordance with the site-specific safety plan included in Appendix E.

Report

After completion of the proposed field activities, a report summarizing the field activities, laboratory results and boring logs will be submitted to ExxonMobil and the CRWQCB-LAR. The report will be signed by a State of California professional geologist.

CONTACT INFORMATION

The responsible party contact is Mr. Mahesh Vidyasagar, ExxonMobil Environmental Services, 12450 Greenspoint Drive, GSC-GP6-1004, Houston, Texas 77060. The consultant contact is Mr. James Anderson, Cardno ERI, 4572 Telephone Road, Suite 916, Ventura, California 93003. The agency contact is Dr. Ann Chang, California Regional Water Quality Control Board-Los Angeles Region, 320 West 4th Street, Suite 200, Los Angeles, California 90013.

LIMITATIONS

For any reports cited that were not generated by Cardno ERI, the data taken from those reports is used “as is” and is assumed to be accurate. Cardno ERI does not guarantee the accuracy of this data and makes no warranties for the referenced work performed nor the inferences or conclusions stated in these reports.

This report was prepared in accordance with generally accepted standards of environmental, geological and engineering practices in California at the time of investigation. No soil engineering or geotechnical references are implied or should be inferred. The evaluation of the geologic conditions at the site for this investigation is made from a limited number of data points. Subsurface conditions may vary away from these data points.

November 1, 2010
Cardno ERI 08115503.W01

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Shaping the Future

For any questions concerning the content of this Work Plan, please contact Mr. James Anderson at 805 644 4157, extension 181805.

Sincerely,

PROFESSIONAL GEOLOGIST
ANDREW B. NELSON
exp. 9/30/11
NO 8360
STATE OF CALIFORNIA

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cc: Mr. Lee Hanley, EMES
Mr. Greg Chila, The O'Donnell Group
Mr. Thomas Clark, Clark Holdings, LLC

Enclosures:

References
Acronym List

Plate 1	Site Location Map
Plate 2	Generalized Site Plan
Plate 3	Well Construction Diagram

Appendix A	Correspondence
Appendix B	CHT's Approximate Locations of Proposed Groundwater Monitoring Wells
Appendix C	ARCADIS' Additional Detected Analytes, Former Jalk Fee Property
Appendix D	CH2MHILL Figure 1-4 Composite PCE Distribution
Appendix E	Field Protocol
Appendix F	Site Safety Plan

REFERENCES

Alton Geoscience. October 10, 1997. *Site Assessment Report and Remedial Action Plan*.

Alton Geoscience. October 15, 1998. *Remedial Excavation/ Site Closure Report*.

ARCADIS. October 27, 2009. *2009 Annual Groundwater Monitoring Report and Closure Request*.

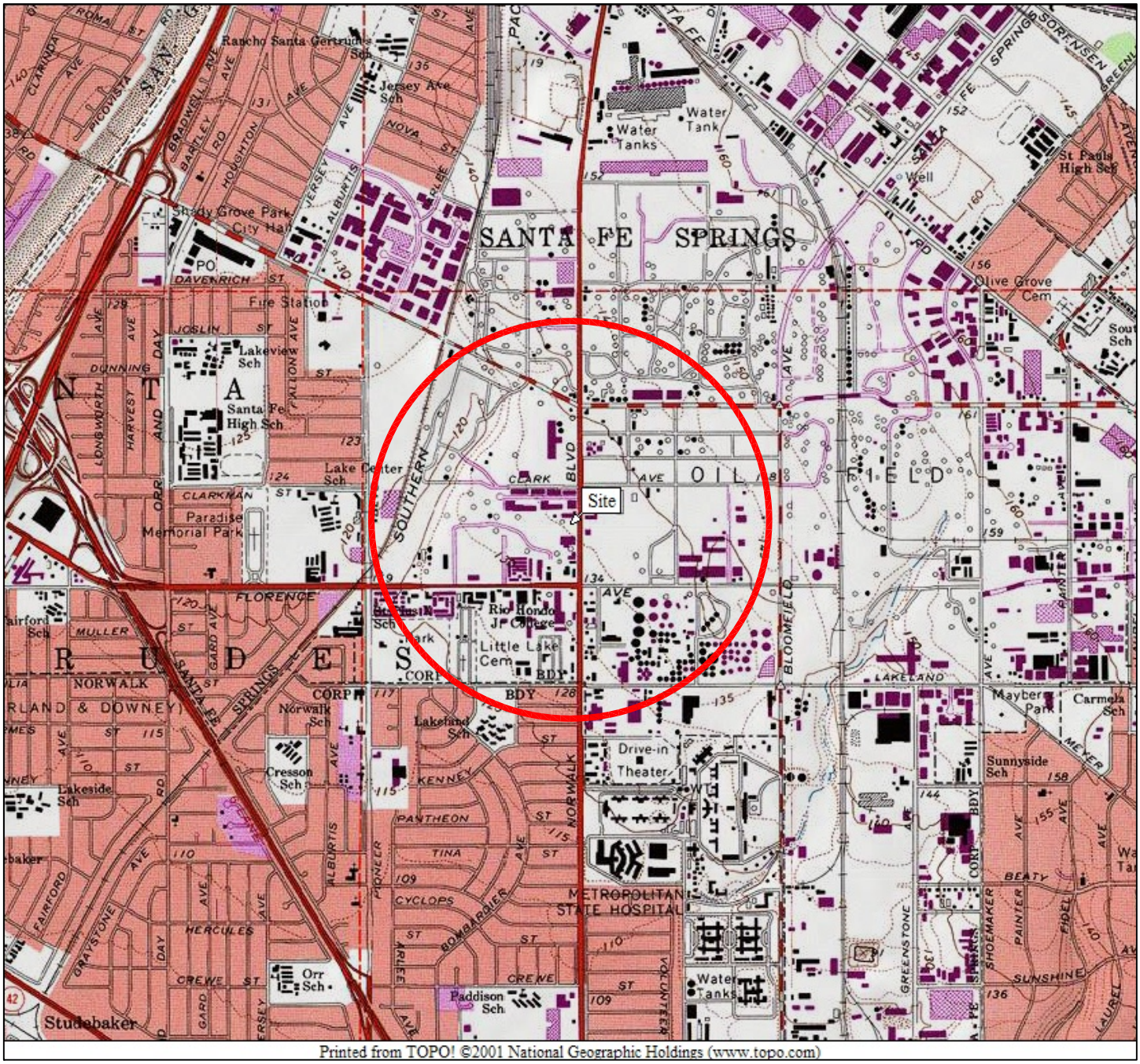
California Department of Water Resources, 1961, *Groundwater Geology of the Coastal Plain of Los Angeles County, Idealized Geologic Sections M-M'-M" and N-N'*.

CH2MHILL. August 2010. *Feasibility Study Report, Omega Chemical Corporation Superfund Site, Operable Unit 2, Whittier, California*.

TRC. November 28, 2000. *Site Closure Report and Risk Assessment*.

ACRONYM LIST

µg/L	Micrograms per liter
µs	Microsiemens
1,2-DCA	1,2-dichloroethane
acfm	Actual cubic feet per minute
AS	Air sparge
bgs	Below ground surface
BTEX	Benzene, toluene, ethylbenzene, and total xylenes
CEQA	California Environmental Quality Act
cfm	Cubic feet per minute
COC	Chain of Custody
CPT	Cone Penetration (Penetrometer) Test
DIPE	Di-isopropyl ether
DO	Dissolved oxygen
DOT	Department of Transportation
DPE	Dual-phase extraction
DTW	Depth to water
EDB	1,2-dibromoethane
EPA	Environmental Protection Agency
ESL	Environmental screening level
ETBE	Ethyl tertiary butyl ether
FID	Flame-ionization detector
fpm	Feet per minute
GAC	Granular activated carbon
gpd	Gallons per day
gpm	Gallons per minute
GWPTS	Groundwater pump and treat system
HVOC	Halogenated volatile organic compound
J	Estimated value between MDL and PQL
LEL	Lower explosive limit
LPC	Liquid-phase carbon
LRP	Liquid-ring pump
LUFT	Leaking underground fuel tank
LUST	Leaking underground storage tank
MCL	Maximum contaminant level
MDL	Method detection limit
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
mg/m3	Milligrams per cubic meter
MPE	Multi-phase extraction
MRL	Method reporting limit
msl	Mean sea level
MTBE	Methyl tertiary butyl ether
MTCA	Model Toxics Control Act
NAI	Natural attenuation indicators
NAPL	Non-aqueous phase liquid
NEPA	National Environmental Policy Act
NGVD	National Geodetic Vertical Datum
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
ORP	Oxidation-reduction potential
OSHA	Occupational Safety and Health Administration
OVA	Organic vapor analyzer
P&ID	Process & Instrumentation Diagram
PAH	Polynuclear aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PCE	Tetrachloroethene or perchloroethylene
PID	Photo-ionization detector
PLC	Programmable logic control
POTW	Publicly owned treatment works
ppmv	Parts per million by volume
PQL	Practical quantitation limit
psi	Pounds per square inch
PVC	Polyvinyl chloride
QA/QC	Quality assurance/quality control
RBSL	Risk-based screening levels
RCRA	Resource Conservation and Recovery Act
RL	Reporting limit
scfm	Standard cubic feet per minute
SSTL	Site-specific target level
STLC	Soluble threshold limit concentration
SVE	Soil vapor extraction
SVOC	Semivolatile organic compound
TAME	Tertiary amyl methyl ether
TBA	Tertiary butyl alcohol
TCE	Trichloroethene
TOC	Top of well casing elevation; datum is msl
TOG	Total oil and grease
TPHd	Total petroleum hydrocarbons as diesel
TPHg	Total petroleum hydrocarbons as gasoline
TPHmo	Total petroleum hydrocarbons as motor oil
TPHs	Total petroleum hydrocarbons as Stoddard solvent
TRPH	Total recoverable petroleum hydrocarbons
UCL	Upper confidence level
USCS	Unified Soil Classification System
USGS	United States Geologic Survey
UST	Underground storage tank
VCP	Voluntary Cleanup Program
VOC	Volatile organic compound
VPC	Vapor-phase carbon



Printed from TOPO! ©2001 National Geographic Holdings (www.topo.com)

FN 1155TOPO

Map Name: Whittier, CA
Version: 1981

EXPLANATION

1/2-mile radius circle

N

APPROXIMATE SCALE

0 0.5 1 mile

SOURCE:
Modified from a map
provided by
National Geographic's TOPO!

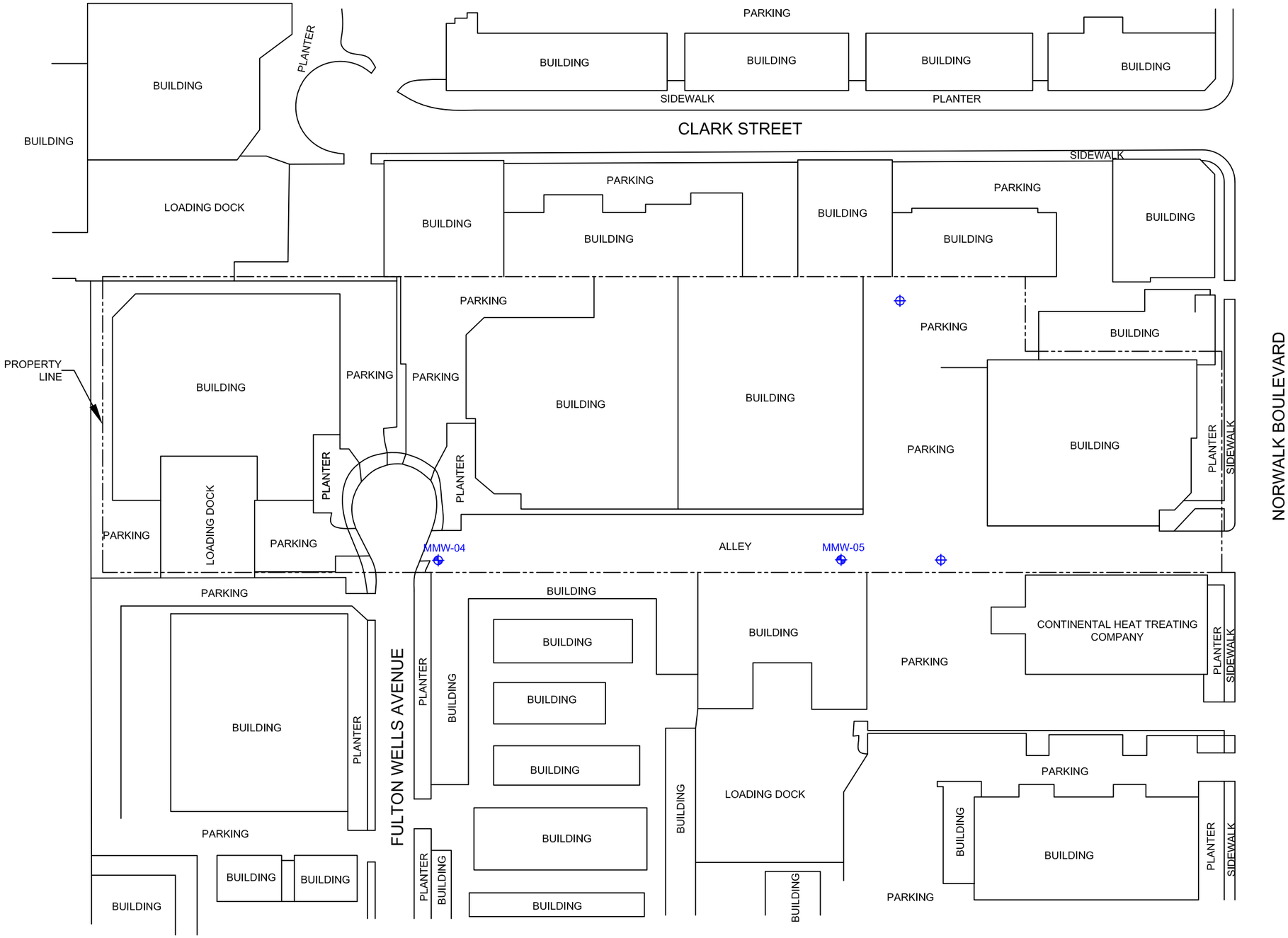
ERI
VALUE, QUALITY, RESPONSE

SITE LOCATION MAP

FORMER EXXONMOBIL JALK FEE PROPERTY
10607 Norwalk Boulevard
Santa Fe Springs, California

PROJECT NO.
1155

PLATE
1



EXPLANATION

MMW-05 Groundwater monitoring well

Proposed groundwater monitoring well

N

SOURCE:
Modified from a map provided by GOOGLE EARTH

APPROXIMATE SCALE

0 120 240
FEET

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GENERALIZED SITE PLAN

FORMER EXXONMOBIL JALK FEE PROPERTY
10607 Norwalk Boulevard
Santa Fe Springs, California

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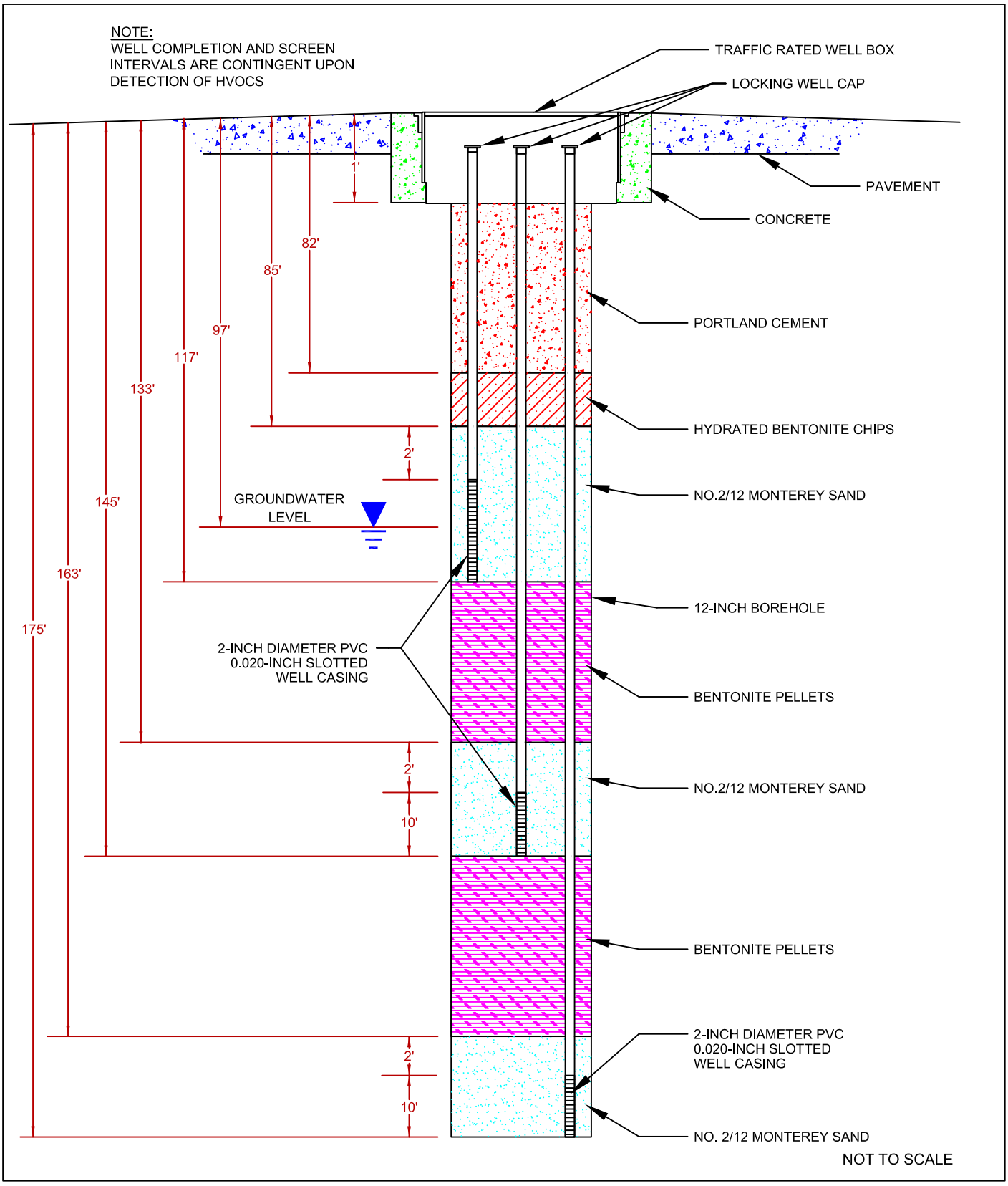
PROJECT NO. 1155

PLATE 2

DATE: 10/27/10



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WELL CONSTRUCTION DIAGRAM

FORMER EXXONMOBIL JALK FEE PROPERTY
10607 Norwalk Boulevard
Santa Fe Springs, California

PROJECT NO. 1155

PLATE 3

DATE: 10/28/10

APPENDIX A

CORRESPONDENCE

California Regional Water Quality Control Board

Los Angeles Region

320 W. 4th Street, Suite 200, Los Angeles, California 90013
Phone (213) 576-6600 FAX (213) 576-6640 - Internet Address: http://www.waterboards.ca.gov/losangeles

August 24, 2010

Mr. Mahesh Vidyasagar
ExxonMobil Environmental Services
ExxonMobil Production Company
12450 Greenspoint Drive
GSC-GP6-1004
Houston, Texas 77060

Certified Mail
Return Receipt Requested
Claim No. 7009 0820 0001 6811 9558

CALIFORNIA WATER CODE SECTION 13267 ORDER: REQUIRING SUBMITTAL OF TECHNICAL REPORTS – FORMER EXXONMOBIL JALK FEE PROPERTY, 10607 NORWALK BOULEVARD, SANTA FE SPRINGS, CALIFORNIA (SCP NO. 0203, SITE ID NO. 1848000)

Dear Mr. Vidyasagar:

The California Regional Water Quality Control Board, Los Angeles Region (Regional Board) is the State regulatory agency responsible for protecting water quality in Los Angeles and Ventura Counties. To accomplish this, the Regional Board issues investigative orders authorized by the Porter-Cologne Water Quality Control Act (California Water Code [CWC], Division 7). Enclosed is a Regional Board Order (Order) requiring submittal of technical reports pursuant to CWC section 13267. The Order requires submittal of technical reports for the lateral and vertical delineation of groundwater contamination originating from the site.

Following review of the *2009 Annual Groundwater Report & Closure Request*, dated October 27, 2009, Regional Board staff held a meeting with you and your environmental consultant to discuss groundwater closure related issues on March 16, 2010. Based on the meeting discussion, the Regional Board issued a letter dated March 30, 2010 (enclosed) stating the reasons for not granting groundwater closure and requesting the submittal of a work plan for further delineation of groundwater contamination from releases at the site. At your request, the initial due date for the work plan was extended to July 30, 2010. By the extended due date of July 30, 2010, the Regional Board had not received the requested work plan for additional groundwater investigation. Instead, the Regional Board received the *Response to CRWQCB-LAR Directive Letter*, dated July 30, 2010, prepared and submitted on your behalf by Environmental Resolutions, Inc. (ERI).

In the July 30, 2010 letter, ERI stated that the source of the chlorinated volatile organic compounds (VOCs) in soil along the southeastern property boundary was from the Continental Heat Treating (CHT) facility, that chlorinated VOCs in groundwater originated from both the CHT facility and the regional Omega Chemical Superfund area, and that corrective action regarding the residual chlorinated VOCs detected on both the former Jalk Fee property and CHT facility should be directed to the responsible party of the CHT facility. Therefore, ERI requested that the Regional Board's March 30, 2010 directive requiring ExxonMobil to conduct additional groundwater assessment be rescinded.

Based on review of your July 30, 2010 letter, Regional Board staff have not identified any new information indicating that additional investigations for groundwater contamination originating from the subject site are not needed. Therefore, the Regional Board stands by the previous determination that you are required to submit technical reports to adequately delineate the lateral and vertical extent of groundwater contamination from releases at the site.

If you have any questions, please contact me at (213) 620-6070 or achang@waterboards.ca.gov.

Sincerely,

Ann Chang

Ann Chang, Ph.D.
Water Resource Control Engineer
Site Cleanup Unit I

Enclosures:
1. Regional Board CWC section 13267 Order dated August 27, 2010
2. Regional Board letter dated March 30, 2010

cc:
James Anderson, Environmental Resolutions, Inc.
Richard N. Racouillat, Law Offices, 1301 Chorro Street, San Luis Obispo, CA 93401
Michelle F. Smith, 10629 Norwalk Boulevard, Santa Fe Springs, CA 90670
Thomas Clark, Coast Aluminum and Architectural Inc., 10628 Fulton Wells Avenue, Santa Fe Springs, CA 90670
William Macnider, CSI Electric Contractors, 10623 Fulton Wells Avenue, Santa Fe Springs, CA 90670.

California Regional Water Quality Control Board
Los Angeles Region

320 W. 4th Street, Suite 200, Los Angeles, California 90013
Phone (213) 576-6600 FAX (213) 576-6640 - Internet Address: http://www.waterboards.ca.gov/losangeles

REQUIRING SUBMITTAL OF TECHNICAL REPORTS
(CALIFORNIA WATER CODE SECTION 13267 ORDER)

DIRECTED TO EXXONMOBIL PRODUCTION COMPANY

FORMER EXXONMOBIL JALK FEE PROPERTY
10607 NORWALK BOULEVARD, SANTA FE SPRINGS, CALIFORNIA
(SCP NO. 0203, SITE ID NO. 1848000)

You are legally obligated to respond to this Order. Please read this carefully.

Pursuant to section 13267(b) of the California Water Code (CWC), you are hereby directed to submit the following:

1. By **November 1, 2010**, you are required to submit the first work plan for further groundwater investigation to adequately delineate the lateral and vertical extent of groundwater contamination from releases at the site. Additional multiple-depth groundwater monitoring wells shall be installed at the identified on-site source (soil contamination) areas and in the upgradient, crossgradient, and downgradient directions.

   Following the approval of the required first work plan, additional groundwater investigation(s) shall be conducted until the lateral and vertical extent of the groundwater contamination originating from the site is adequately defined. A report or reports documenting the results of the required investigation(s) shall be submitted by the due date(s) specified in the work plan approval or report review comment letter(s) or other correspondences from the Regional Board.

2. Following the installation of the new groundwater monitoring wells, monitoring and sampling of all existing and new groundwater monitoring wells shall be conducted on a semi-annual basis. The semi-annual groundwater monitoring reports shall be submitted according to the following schedule, with the next report due by **August 15, 2011**:

Monitoring Period	Report Due Date
May	August 15
November	February 15

Pursuant to section 13268(b)(1) of the CWC, failure to submit the required technical reports described above may result in the imposition of civil liability penalties by the Regional Board in an amount up to one thousand dollars ($1,000) for each day each technical report is not received after the above due date.

The Regional Board needs the technical information in order to determine the lateral and vertical extent of groundwater contamination from on-site releases of chlorinated volatile organic compounds (VOCs). You are being required to submit the technical reports based on the following justifications:

A. Site soil data collected to date have not indicated that detected chlorinated VOC contamination in soil at the southern portion of the site is completely from the release of chlorinated solvents at the adjacent property, occupied by the Continental Heat Treating (CHT) facility. Similar to ExxonMobil's claim, CHT claims that soil contamination encountered at the CHT facility is from the release of petroleum hydrocarbons and chlorinated VOCs at the former Jalk Fee property.

B. Based on the results of historical soil assessment, tetrachloroethene (PCE) was detected at concentrations up to 42,000 micrograms per kilogram (µg/kg) in soil borings at sampled depths ranging from 5 to 61 feet below ground surface (bgs) across the southern portion of the site. Chlorinated VOCs concentrations detected throughout the sampled soil indicate the on-site release of chlorinated VOCs to the subsurface, which have impacted soil and groundwater beneath the site. Review of the soil boring logs (HS-1 through HS-4) indicates that depth to groundwater was approximately 61.5 feet bgs when the 61-foot soil samples were collected in July 1997.

C. Previous remedial excavation activities were conducted to remove chlorinated VOCs impacted soil to a depth of approximately 15 feet bgs only. Known residual cis-1,2-dichloroethene (DCE) and PCE contamination in soil remains at concentrations up to 2,000 µg/kg and 1,400 µg/kg, respectively, between 15 feet and 61 feet bgs. The residual chlorinated VOCs may act as a continuing source of groundwater contamination beneath the subject site and vicinity.

D. During the last 7 years of annual groundwater monitoring, PCE and trichloroethene (TCE) were detected in monitoring well MMW-5 at concentrations up to 660 micrograms per liter (µg/L) and 190 µg/L, respectively. Monitoring well MMW-5 is located crossgradient from and adjacent to one identified on-site soil contamination area.

E. The site is located within the United States Environmental Protection Agency (USEPA) Omega Superfund Site groundwater plume boundaries. The Remedial Investigation and Feasibility Study have been completed for the Omega Superfund Site. Currently, the USEPA has proposed remedial alternatives to contain the approximately 4.5 miles long plume of contaminated groundwater within the Omega Superfund Site boundaries.

F. Based on the groundwater sampling data obtained to date, the USEPA has determined that groundwater quality in the area of the site has been impacted by chlorinated VOCs released from multiple sources, including the subject site and the CHT facility at the adjacent property to the south. To characterize groundwater contamination and to minimize continuing contribution from identified and suspected source areas, USEPA has requested the Regional Board to require all identified or suspected responsible parties to conduct additional subsurface investigations and/or remediation at their sites.

G. On May 5, 2010, the Regional Board issued a CWC section 13267 Order, requiring CHT to prepare and submit technical report(s) for the lateral and vertical delineation of impacted soil, soil-gas, and groundwater at and in the vicinity of the CHT facility.

H. There are no groundwater monitoring wells, upgradient, crossgradient to the east and southeast, and downgradient, from the identified on-site area of soil contaminated with chlorinated VOCs. Existing monitoring wells MMW-4 and MMW-5 are not adequate to monitor the magnitude and configuration of the groundwater chlorinated VOCs plume originating from the identified on-site soil contamination area. Therefore, additional groundwater investigations are needed to adequately delineate the lateral and vertical extent of groundwater contamination originating from the identified soil contamination area at the site.

We believe that the burdens, including costs, of these reports bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports. If you disagree and have information about the burdens, including costs, of complying with these requirements, provide such information to Dr. Ann Chang within10 days of the date of this Order so that we may reconsider the requirements.

All future technical reports required pursuant to the CWC section 13267 Orders shall contain the following completed perjury statement. The perjury statement shall be signed by a senior authorized [NAME OF RESPONSIBLE PARTY'S or DISCHARGER'S COMPANY] representative (and not by a consultant). It shall be in the following format:

"I [NAME], do hereby declare, under penalty of perjury under the laws of the State of California, that I am [JOB TITLE] for [NAME OF RESPONSIBLE PARTY\DISCHARGER], that I am authorized to attest to the veracity of the information contained in the reports described herein, and that the information contained in [NAME AND DATE OF REPORT] is true and correct, and that this declaration was executed at [PLACE], [STATE], on [DATE]."

Any person aggrieved by this action of the Regional Water Board may petition the State Water Board to review the action in accordance with Water Code section 13320 and California Code of Regulations, title 23, sections 2050 and following. The State Water Board must receive the petition by 5:00 p.m., 30 days after the date of this Order, except that if the thirtieth day following the date of this Order falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at: http://www.waterboards.ca.gov/public_notices/petitions/water_quality or will be provided upon request.

SO ORDERED.

August 24, 2010

Samuel Unger, P.E.
Interim Executive Officer

California Regional Water Quality Control Board
Los Angeles Region

320 W. 4th Street, Suite 200, Los Angeles, California 90013
Phone (213) 576-6600 FAX (213) 576-6640 - Internet Address: http://www.waterboards.ca.gov/losangeles

Linda S. Adams
Cal/EPA Secretary

Arnold Schwarzenegger
Governor

March 30, 2010

Mr. Mahesh Vidyasagar
ExxonMobil Environmental Services
12450 Greenspoint Drive
GSC-GP6-1004
Houston, Texas 77060

RESPONSE TO REQUEST FOR GROUNDWATER CLOSURE – EXXONMOBIL FORMER JALK FEE PROPERTY, 10607 NORWALK BOULEVARD, SANTA FE SPRINGS, CALIFORNIA (SCP NO. 0203, SITE ID NO. 1848000)

Dear Mr. Vidyasagar:

Los Angeles Regional Water Quality Control Board (Regional Board) staff have received and reviewed the *2009 Annual Groundwater Monitoring Report and Closure Request* (Report), dated October 27, 2009, prepared by Arcadis for the reference site. In addition, Regional Board staff held a meeting with representatives of ExxonMobil Environmental Services Company (ExxonMobil) and Environmental Resolutions (new consultant) on March 16, 2010, to discuss groundwater closure related issues.

The site is approximately 8.8 acres in size and redeveloped into an industrial park in 2003, following soil remediation activities. The site had been used for oil production activities from the 1920s to the 1990s. The abandonment and removal of oil wells, pipelines, and a tank farm were conducted in 2000. Historical site assessment activities indicated that soil was impacted with petroleum hydrocarbons and halogenated volatile organic compounds (HVOCs). Following remedial excavation of petroleum hydrocarbons and chlorinated solvent contaminated soils to depths up to 24 feet below ground surface (bgs), the site was granted soil closure by the Regional Board in the letters dated March 1, 1999 and March 5, 2001, to promote the site redevelopment.

Three groundwater monitoring wells (MMW-3, MMW-4, and MMW-5) were installed at the site in 1994 as part of requirements for on-site land treatment of petroleum hydrocarbons impacted soil. Monitoring well MMW-3 was abandoned in 2001. The primary contaminants of concern in groundwater beneath the site are HVOCs, including tetrachloroethylene (PCE) and trichloroethylene (TCE). During the last 9 years of groundwater monitoring, PCE and TCE were detected at concentrations up to 660 micrograms per liter (µg/L) and 190 µg/L, respectively, in monitoring well MMW-5. Monitoring well MMW-5 is located crossgradient from and adjacent to the identified on-site soil contamination area. Based on the evaluation of 9 years of post soil closure groundwater monitoring data, Arcadis, on behalf of ExxonMobil, requested groundwater closure for the subject site.

Based on our review of the Report and file documents, Regional Board staff have determined that groundwater closure at the site can not be granted at this time for the following reasons:

1. Based on the results of historical soil assessment, HVOCs were detected at concentrations up to 42,000 micrograms per kilogram (µg/kg) in soil borings at depths ranging from 5 to 35 feet bgs across the southern portion of the site. Detectable HVOCs concentrations throughout the sampled soil columns suggest on-site releases of HVOCs to groundwater beneath the site.

2. Previous remedial excavation activities were conducted to remove HVOCs impacted soil to a depth of approximately 15 feet bgs only. Residual HVOCs contamination in soil remains at concentrations up to 1,400 µg/kg between 15 feet and 35 feet bgs. The residual HVOCs may act as a continuing source of groundwater contamination beneath the site and vicinity.

3. There are no groundwater monitoring wells, upgradient, crossgradient to the east and southeast, and downgradient, from the identified on-site area of soil contamination, located at the southern portion of the site. Existing monitoring wells MMW-4 and MMW-5 are not adequate to monitor the magnitude and configuration of the HVOCs plume in groundwater originating/contributing from the on-site source area.

4. To adequately delineate the lateral and vertical extent of groundwater contamination from releases at the site, please submit a work plan for further groundwater investigation to the Regional Board by **July 1, 2010**. Additional monitoring wells shall be screened at multiple depths and installed at the identified source areas and in the upgradient, crossgradient, and downgradient directions.

5. Pursuant to Division 7 of the Porter Cologne Water Quality Control Act under section 13307.1, the Regional Board is required to notify all current fee title holders for the subject site prior to considering corrective action or granting case closure. Therefore, you are required to provide the name, mailing address and telephone number for all record fee title holders for the site together with a copy of the county record of current ownership, available from the County Recorder's Office, or you may complete the attached Certification Declaration Form and submit it to the Regional Board by **July 1, 2010**.

If you have any questions, please contact Dr. Ann Chang at (213) 620-6070 or achang@ waterboards.ca.gov.

Sincerely,

Tracy J. Egoscue
Executive Officer

Attachment: Certification Declaration Form

cc: James Anderson, Environmental Resolutions, Inc.

California Regional Water Quality Control Board

Los Angeles Region

Linda S. Adams.
Cal/EPA Secretary

320 W. 4th Street, Suite 200, Los Angeles, California 90013
Phone (213) 576-6600 FAX (213) 576-6640 - Internet Address: http://www.waterboards.ca.gov/losangeles

Arnold Schwarzenegger
Governor

ATTACHMENT 3

CERTIFICATION DECLARATION FOR COMPLIANCE WITH FEE TITLE HOLDER NOTIFICATION REQUIREMENTS (California Water Code Section 13307.1)

Please Print or Type

Fee Title Holder(s): _____

Mailing Address: _____

Contact Person: _____

Telephone Number / Fax Number: _____

Site Name: _____

Address: _____

County Assessor Parcel Number (APN): _____

Contact Person: _____

Telephone Number / Fax Number: _____

File Number: _____ Site Cleanup Program No. 0203 _____

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations." (See attached page for who shall sign the Certification Declaration).

_____ _____
Printed Name of Person Signing Official Title

_____ _____
Signature Date Signed

The certification declaration form must be signed as follows:

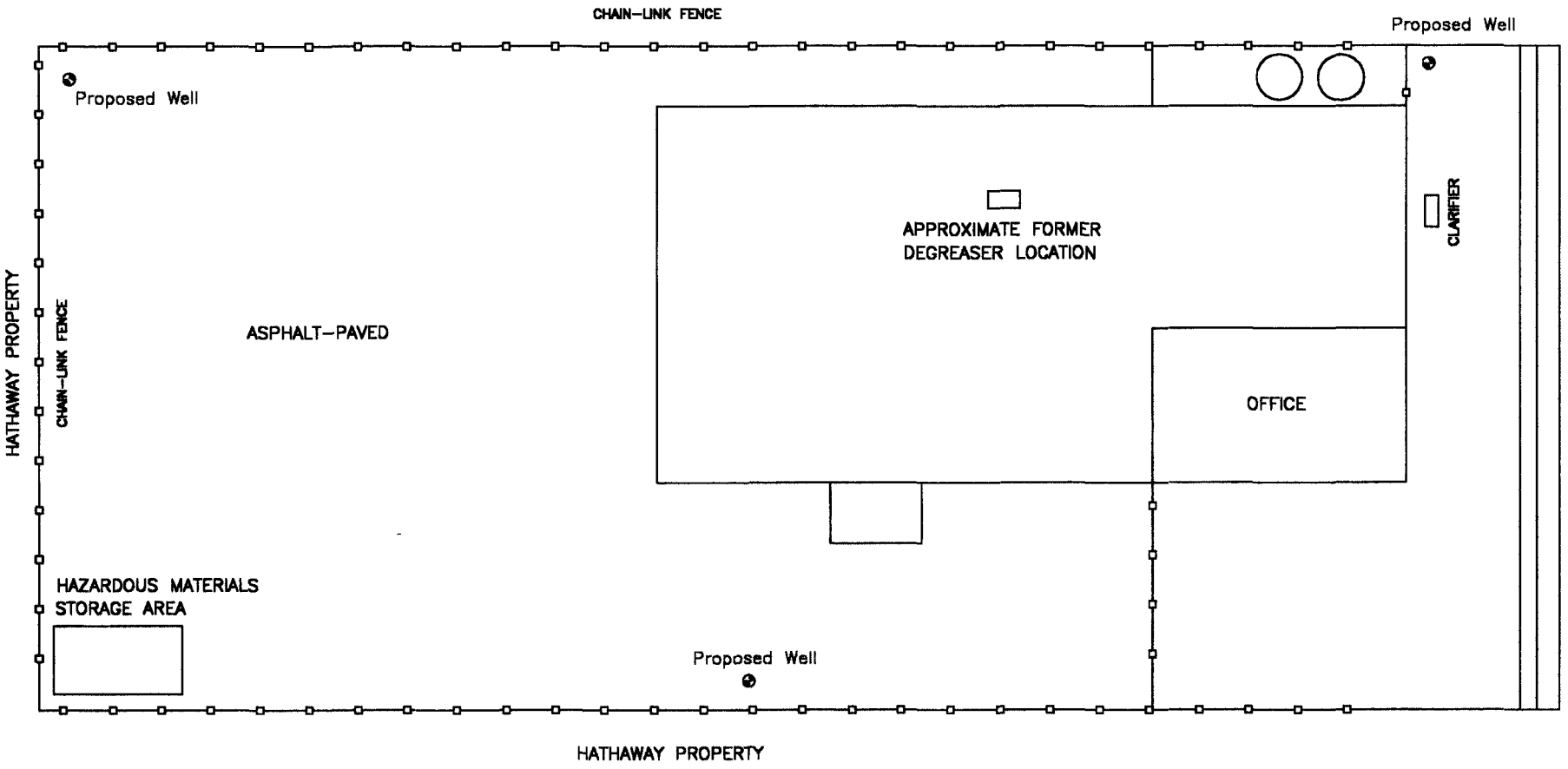
1. For a corporation - by a responsible corporate officer, which means; (i) by a president, secretary, treasurer, or vice president of the corporation in charge of a principal business function, or any other person who performs similar policy of decision making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million, if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

2. For a partnership or sole proprietorship – by a general partner or the proprietor respectively.

3. For a municipality, state, federal, or public agency - by either a principal executive officer or ranking elected official. A principal executive officer of a federal agency includes (i) the chief executive officer of the agency or (ii) a senior executive officer having responsibility for the overall operations or a principal geographic unit.

APPENDIX B

CHT'S APPROXIMATE LOCATIONS OF PROPOSED GROUNDWATER MONITORING WELLS



0 25 50

APPROXIMATE SCALE IN FEET

N

FIGURE 2

APPROXIMATE LOCATIONS OF PROPOSED GROUNDWATER MONITORING WELLS
CONTINENTAL HEAT TREATING, INC.
10643 SOUTH NORWALK BOULEVARD
SANTA FE SPRINGS, CALIFORNIA
EST1315/WORK PLAN FOR WELL INSTALLATION AND MONITORING
DRAWN BY: JST/MET SCALE: AS SHOWN DATE: 02-22-02

SOURCE OF BASE MAP: TRILOGY REGULATORY SERVICES

CHT WELL LOCS

APPENDIX C

ARCADIS' ADDITIONAL DETECTED ANALYTES, FORMER JALK FEE PROPERTY

ARCADIS

Additional Detected Analytes
Former Jalk Fee Property

Well Number	Date Sampled	Acetone µg/L (ppb)	Chloroform µg/L (ppb)	1,4-Dichlorobenzene µg/L (ppb)	c-1,2-Dichloroethene µg/L (ppb)	1,1-Dichloroethane µg/L (ppb)	1,2-Dichloroethane µg/L (ppb)	1,1-Dichloroethene µg/L (ppb)	t-1,2-Dichloroethene µg/L (ppb)	1,2-Dichloropropane µg/L (ppb)	PCE µg/L (ppb)	TCE µg/L (ppb)	1,2,3-Tri Chlorobenzene µg/L (ppb)	1,1,1-Trichloroethane µg/L (ppb)	Trichlorofluoro-methane µg/L (ppb)	1,1,2-Trichloro-1,2,2 Trifluoroethane µg/L (ppb)	1,2,4-Trimethyl-benzene µg/L (ppb)
MMW-3	08/31/00	--	--	ND	--	1.7	--	6.5	--	--	4.4	0.5	ND	--	--	--	--
	03/05/01	5.7 J	ND<1.0	ND	0.65 J	1.5	ND<0.50	7.5	ND<1.0	ND<1.0	14	20	ND	ND<1.0	ND<10	--	ND<1.0
	06/12/01	ND<10	ND<1.0	ND	ND<1.0	1.9	0.97	9.9	ND<1.0	1.4	9.5	22	ND	ND<1.0	ND<10	--	ND<1.0
	Well Abandoned																
MMW-4	08/31/00	--	--	ND	--	1.9	--	2.0	--	--	6.7	17	ND	ND<1.0	--	--	--
	03/05/01	7.3 J	ND<1.0	ND	2.3	2.7	0.62	5.4	ND<1.0	ND<1.0	26	27	ND	ND<1.0	ND<10	--	ND<1.0
	06/12/01	ND<10	ND<1.0	ND	2.0	2.6	1.1	4.7	ND<1.0	ND<1.0	11	21	ND	ND<1.0	ND<10	--	1.2
	12/23/03	ND<10	ND<1.0	ND	ND<1.0	2.3	0.84	8.8	ND<1.0	ND<1.0	16	21	ND	ND<1.0	ND<10	--	ND<1.0
	12/21/04	ND<10	0.23 J	ND	0.83 J	2.4	1.4	14	ND<1.0	1.6	14	22	ND	ND<1.0	ND<10	ND<10	ND<1.0
	12/02/05	ND<10	ND<1.0	ND	0.71 J	1.8	ND<0.50	15	ND<1.0	ND<1.0	15	17	ND	ND<1.0	ND<10	ND<10	ND<1.0
	12/19/06	11 J	ND<1.0	ND	0.68 J	1.9	0.64	12	ND<1.0	1.1	9.1	15	ND	ND<1.0	ND<10	ND<10	ND<1.0
	12/21/07	ND<50	ND<1.0	ND	1.8	3.2	0.53	34	ND<1.0	3.0	17	23	ND	ND<1.0	ND<10	ND<10	ND<1.0
	10/24/08	ND<50	1.3	0.25 J	5.8	4.5	0.53	45	ND<1.0	4.1	26	27	0.36 J,B	ND<1.0	0.82 J	2.0 J	ND<1.0
	09/22/09	ND<50	1.7	ND<1.0	47	17	2.4	130	ND<1.0	ND<1.0	71	60	ND<1.0	0.52 J	3.9 J	8.1 J	ND<1.0
MMW-5	09/15/00	--	--	ND	--	ND<1.0	--	ND<1.0	--	--	ND<1.0	ND<1.0	ND	--	--	--	--
	03/05/01	62	ND<5.0	ND	4.1 J	3.6 J	ND<2.5	61	ND<5.0	ND<5.0	650	63	ND	ND<5.0	ND<50	--	ND<5.0
	06/12/01	ND<20	ND<2.0	ND	3.7	3.2	1.3	42	ND<2.0	2.5	350	44	ND	ND<2.0	ND<20	--	ND<2.0
	12/23/03	ND<10	1.6	ND	61	14	4.8	190	ND<1.0	2.5	660	140	ND	5.2	ND<10	--	ND<1.0
	12/21/04	ND<100	3.0 J	ND	180	43	21	370	ND<10	ND<10	510	190	ND	ND<10	10 J	14 J	ND<10
	12/02/05	ND<10	1.4	ND	120	33	8.7	220	ND<1.0	ND<1.0	330	110	ND	4.3	5.3 J	12	ND<1.0
	12/19/06	ND<50	1.4	ND	120	37	7.6	240	1.1	1.8	160	100	ND	3.6	7.1 J	ND<10	ND<1.0
	12/21/07	ND<250	ND<5.0	ND	110	36	6.8	190	ND<5.0	ND<5.0	640	110	ND	ND<5.0	ND<50	ND<50	ND<5.0
	10/24/08	ND<250	1.8 J	1.2 J	96	29	5.4	130	3.1 J	ND<5.0	510	100	3.0 J,B	ND<5.0	6.6 J	15 J	ND<5.0
	09/22/09	ND<250	1.5	ND<1.0	120	42	7.7	190	0.90 J	ND<1.0	160	120	ND<1.0	1.2	7.4 J	24	ND<1.0

Notes:

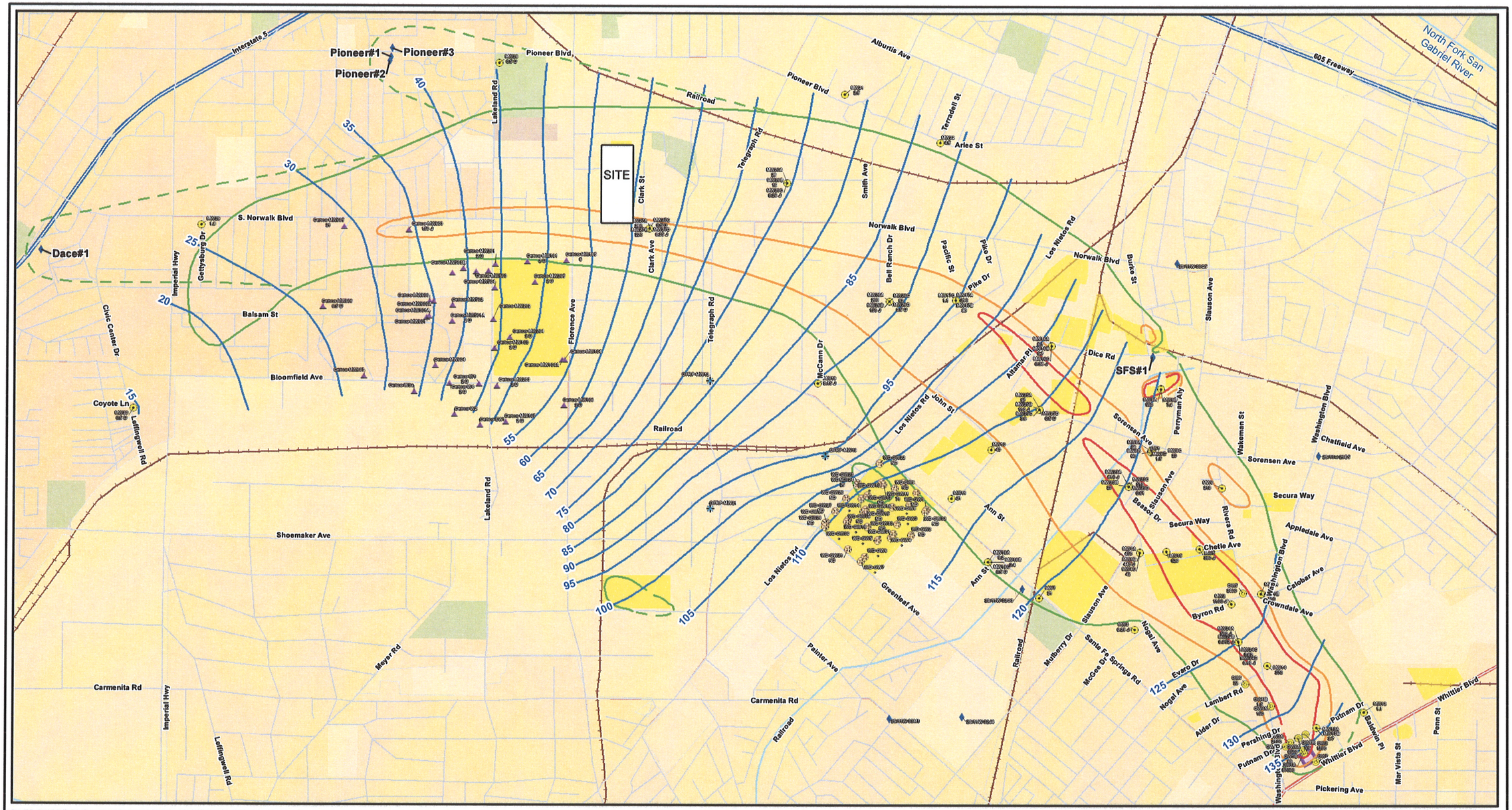
Results obtained using EPA Method 8260B.
µg/L = Micrograms per liter
ppb = Parts per billion

ND = Not detected
J = Estimated value
-- = Not analyzed

PCE = Tetrachloroethene
TCE = Trichloroethene
B = Analyte was present in the associated method blank

APPENDIX D

CH2MHILL FIGURE 1-4 COMPOSITE PCE DISTRIBUTION



Legend

- EPA Monitoring Well (July 2007)
- Omega Potentially Responsible Parties Organized Group (OPOG) Monitoring Well (August 2007)
- Oil Field Reclamation Project (OFRP) Well
- Waste Disposal, Inc. (WDI) Well (4th Quarter, 2002)
- Active Production Well (Locations shown are approximate)
- CENCO Wells (August - November 2006)
- Approximate Boundary of Facilities
- Former Omega Facility

Composite PCE Plume Extent, July 2007

- 5 ug/L
- 100 ug/L
- 500 ug/L
- Potential deep (about 200 feet below ground surface) PCE extent
- Water Level Contours 2007

Notes: 1) J - Estimated Value upper level of instrument calibration range. 2) U - Non-Detect 3) E - Estimated value as the concentration exceen upper level of instrument calibration range. 4) NS - Not Sampled

N

0 1,600 3,200 Feet

\\GALT\PROJ\OMEGA\2010\MAPFILES\11X17_PCE_V2.MXD DDODS

Figure 1-4
Composite PCE Distribution
Omega OU2 Feasibility Study

CH2MHILL

Date: May 5, 2010

APPENDIX E

FIELD PROTOCOL

Cardno ERI
Soil Boring and Well Installation
Field Protocol

Preliminary Activities

Prior to the onset of field activities at the site, Cardno ERI obtains the appropriate permit(s) from the governing agency(s). Advance notification is made as required by the agency(s) prior to the start of work. Cardno ERI marks the borehole locations and contacts the local one call utility locating service at least 48 hours prior to the start of work to mark buried utilities. Borehole locations may also be checked for buried utilities by a private geophysical surveyor. Prior to drilling, the borehole location is cleared in accordance with the client's procedures. Fieldwork is conducted under the advisement of a registered professional geologist and in accordance with an updated site-specific safety plan prepared for the project, which is available at the job site during field activities.

Drilling and Soil Sampling Procedures

Cardno ERI contracts a licensed driller to advance the boring and collect soil samples. The specific drilling method (e.g., hollow-stem auger, direct push method, or sonic drilling), sampling method [e.g., core barrel or California-modified split spoon sampler (CMSSS)] and sampling depths are documented on the boring log and may be specified in a work plan. Soil samples are typically collected at the capillary fringe and at 5-foot intervals to the total depth of the boring. To determine the depth of the capillary fringe prior to drilling, the static groundwater level is measured with a water level indicator in the closest monitoring well to the boring location, if available.

The borehole is advanced to just above the desired sampling depth. For CMSSSs, the sampler is placed inside the auger and driven to a depth of 18 inches past the bit of the auger. The sampler is driven into the soil with a standard 140-pound hammer repeatedly dropped from a height of 30 inches onto the sampler. The number of blows required to drive the sampler each 6-inch increment is recorded on the boring log. For core samplers (e.g., direct push), the core is driven 18 inches using the rig apparatus.

Soil samples are preserved in the metal or plastic sleeve used with the CMSSS or core sampler, in glass jars or other manner required by the local regulatory agency (e.g., Environmental Protection Agency Method 5035). Sleeves are removed from the sample barrel, and the lowermost sample sleeve is immediately sealed with Teflon™ tape, capped and labeled. Samples are placed in a cooler chilled to 4º Celsius and transported to a state-certified laboratory. The samples are transferred under chain-of-custody (COC) protocol.

Field Screening Procedures

Cardno ERI places the soil from the middle of the sampling interval into a plastic re-sealable bag. The bag is placed away from direct sunlight for approximately 20 minutes, after which the tip of a photo-ionization detector (PID) or similar device is inserted through the plastic bag to measure organic vapor concentrations in the headspace. The PID measurement is recorded on the boring log. At a minimum, the PID or other device is calibrated on a daily basis in accordance with manufacturer's specifications using a hexane or isobutylene standard. The calibration gas and concentration are recorded on a calibration log. Instruments such as the PID are useful for evaluating relative concentrations of volatilized hydrocarbons, but they do not measure the concentration of petroleum hydrocarbons in the soil matrix with the same precision as laboratory analysis. Cardno ERI trained personnel describe the soil in the bag according to the Unified Soil Classification System and record the description on the boring log, which is included in the final report.

Air Monitoring Procedures

Cardno ERI performs a field evaluation for volatile hydrocarbon concentrations in the breathing zone using a calibrated PID or lower explosive level meter.

Groundwater Sampling

A groundwater sample, if desired, is collected from the boring by using Hydropunch™ sampling technology or installing a well in the borehole. In the case of using Hydropunch™ technology, after collecting the capillary fringe soil sample, the boring is advanced to the top of the soil/groundwater interface and a sampling probe is pushed to approximately 2 feet below the top of the static water level. The probe is opened by partially withdrawing it and thereby exposing the screen. A new or decontaminated bailer is used to collect a water sample from the probe. The water sample is then emptied into laboratory-supplied containers constructed of the correct material and with the correct volume and preservative to comply with the proposed laboratory test. The container is slowly filled with the retrieved water sample until no headspace remains and then promptly sealed with a Teflon-lined cap, checked for the presence of bubbles, labeled, entered onto a COC record and placed in chilled storage at 4° Celsius. Laboratory-supplied trip blanks accompany the water samples as a quality assurance/quality control procedure. Equipment blanks may be collected as required. The samples are kept in chilled storage and transported under COC protocol to a client-approved, state-certified laboratory for analysis.

Backfilling of Soil Boring

If a well is not installed, the boring is backfilled from total depth to approximately 5 feet below ground surface (bgs) with either neat cement or bentonite grout using a tremie pipe. The boring is backfilled from 5 feet bgs to approximately 1 foot bgs with hydrated bentonite chips. The borehole is completed from 1 foot bgs to surface grade with material that best matches existing surface conditions and meets local agency requirements. Site-specific backfilling details are shown on the respective boring log.

Well Construction

A well (if constructed) is completed using materials documented on the boring log or specified in a work plan. The well is constructed with slotted casing across the desired groundwater sampling depth(s) and completed with blank casing to within 6 inches of surface grade. No further construction is conducted on temporary wells. For permanent wells, the annular space of the well is backfilled with Monterey sand from the total depth to approximately 2 feet above the top of the screened casing. A hydrated granular bentonite seal is placed on top of the sand filter pack. Grout may be placed on top of the bentonite seal to the desired depth using a tremie pipe. The well may be completed to surface grade with a 1-foot thick concrete pad. A traffic-rated well vault and locking cap for the well casing may be installed to protect against surface-water infiltration and unauthorized entry. Site-specific well construction details including type of well, well depth, casing diameter, slot size, length of screen interval and sand size are documented on the boring log or specified in the work plan.

Well Development and Sampling

If a permanent groundwater monitoring well is installed, the grout is allowed to cure a minimum of 48 hours before development. Cardno ERI personnel or a contracted driller use a submersible pump or surge block to develop the newly installed well. Prior to development, the pump is decontaminated by allowing it to run and re-circulate while immersed in a non-phosphate solution followed by successive immersions in potable water and de-ionized water baths. The well is developed until sufficient well casing volumes are removed so that turbidity is within allowable limits and pH, conductivity and temperature levels stabilize in the purge water. The volume of groundwater extracted is recorded on a log.

Following development, groundwater within the well is allowed to recharge until at least 80% of the drawdown is recovered. A new or decontaminated bailer is slowly lowered past the air/water interface in the well, and a water sample is collected and checked for the presence of non-aqueous phase liquid, sheen or emulsions. The water sample is then emptied into laboratory-supplied containers as discussed above.

Surveying

If required, wells are surveyed by a licensed land surveyor relative to an established benchmark of known elevation above mean sea level to an accuracy of +/- 0.01 foot. The casing is notched or marked on one side to identify a consistent surveying and measuring point.

Decontamination Procedures

Cardno ERI or the contracted driller decontaminates soil and water sampling equipment between each sampling event with a non-phosphate solution, followed by a minimum of two tap water rinses. De-ionized water may be used for the final rinse. Downhole drilling equipment is steam-cleaned prior to drilling the borehole and at completion of the borehole.

Waste Treatment and Soil Disposal

Soil cuttings generated from the drilling or sampling are stored on site in labeled, Department of Transportation-approved, 55-gallon drums or other appropriate storage container. The soil is removed from the site and transported under manifest to a client- and regulatory-approved facility for recycling or disposal. Decontamination fluids and purge water from well development and sampling activities, if conducted, are stored on site in labeled, regulatory-approved storage containers. Fluids are subsequently transported under manifest to a client- and regulatory-approved facility for disposal or treated with a permitted mobile or fixed-base carbon treatment system.

APPENDIX F

SITE SAFETY PLAN

SITE SAFETY PLAN

Former Jalk Fee Property
10607 Norwalk Boulevard
Santa Fe Springs, California, 90670

Revision: June 25, 2010

Emergency Contact Information:

James Anderson _____ Date _____

(805) 701-1420
Telephone Number

Environmental Resolutions, Inc. Approvals:

Project Manager: James Anderson _____ Date 8/27/10

(805) 701-1420
Telephone Number

Branch H&S Manager: Majd Neameh _____ Date 8/19/10

Site Safety Officer: [Current Site Foreman – Refer to Daily Safety Tailgate Form]

Amendments or modifications to this plan may be written on a separate page and attached to this plan. Any amendments or modifications must be reviewed and approved by the personnel named above.

SAFETY OBJECTIVES

1. ***The first and foremost priority during this project is to maintain a safe and healthy work environment.***
2. ***Work will not be performed until every necessary safety precaution has been taken.***
3. ***No project objectives will knowingly be allowed to put at risk human health and the environment.***

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1.0 INTRODUCTION

The former Jalk Fee property is located in Santa Fe Springs in the county of Los Angeles. The site is currently developed with commercial buildings and parking lots.

This site safety plan was created in compliance with 29 CFR 1910.120 and CCR Title 8, Section 5192 to describe the safety and health requirements of each phase of operation including the requirements and procedures for employee protection. The provisions set forth in this plan apply to the employees of Environmental Resolutions, Inc. (ERI) and its subcontractors working to conduct the following tasks: **Drilling and groundwater well installation and groundwater monitoring. Additional tasks may be performed if a JSA analyzing the hazards and mitigation actions is included.** The subcontractors may elect to modify these provisions or have a separate supplemental health and safety plan, but only to upgrade or increase the safety requirements, and only with the concurrence of ERI, as designated and accepted in writing.

This site safety plan will address the expected potential hazards that may be encountered at the work site for this project. If changes in site or working conditions occur as activities progress, addenda to this plan will be provided by ERI.

THIS SITE SAFETY PLAN WILL BE ON SITE ANYTIME EMPLOYEES ARE PRESENT TO WORK AT OR ACCESS THE SITE.

1.1 Authority for Site Safety

The Project Manager and the Site Safety Officer are responsible for project safety. The Health and Safety Coordinator is responsible for the overall ERI Health and Safety Program and may choose to audit the site for compliance and take appropriate action to correct deficiencies. The Project Manager is responsible for implementing the provisions of this plan, for providing a copy of this plan to the Site Safety Officer, and for advising the Site Safety Officer on health and safety matters. The Project Manager and Site Safety Officer have the authority to audit site activities for compliance with the provisions of this plan. They may suspend or modify work practices or dismiss subcontractors whose conduct does not meet the requirements specified in this plan.

The Site Safety Officer is responsible for communicating the information contained in this plan to ERI personnel assigned to this project and to the responsible representative of each subcontractor working for ERI on this project.

The Site Safety Officer will be the senior ERI employee on site and is responsible for addressing the following items:

- Implementing the site safety plan, company policies, and procedures.
- Requiring and maintaining adequate safety supplies and equipment inventory on site.
- Conducting daily safety and orientation meetings and advising workers regarding hazards.
- Site control, decontamination, and contamination reduction procedures.
- Reporting accidents or incidents.
- Conducting inspections to determine the effectiveness of the site safety plan and to report any deficiencies to the corporate Health and Safety Coordinator for correction.
- Evaluate presentation of tailgate meeting by Short Service Employee (SSE) if present. SSE is employee who has been with the company less than one year.

The Site Safety Officer does not act as the Confined Space Supervisor for subcontractor work.

All personnel working on site have the authority to suspend work at any time that he or she finds the provisions of the plan are inadequate for worker safety. The Site Safety Officer will promptly inform the Project Manager and the Health and Safety Coordinator of deficiencies within the plan or individuals or subcontractors whose conduct is not consistent with the requirements of this plan.

1.2 Confined Space Entry

ERI personnel are not allowed to enter or perform work in a confined space (or permit required confined space) without direct authorization from a Corporate Officer of the company. A separate confined space entry permit will need to be completed for ERI personnel to conduct work. This health and safety plan does not cover confined space hazards, protocols, or emergency procedures. Subcontractors who are under contract are required to have their confined space entry site safety plan sent to ERI prior to commencing with any work. Their site safety plan will be on site and will be the governing document to be followed for specific task(s) involving confined space entry (permit required or otherwise).

2.0 MEDICAL SURVEILLANCE

ERI personnel and subcontractors engaged in project activities must participate in a medical surveillance program and must be cleared by the examining physician(s) to wear respiratory protection devices and protective clothing for working with hazardous materials. The applicable requirements under both CCR Title 8, Section 5192 and 29 CFR 1910.120 of the Code of Federal Regulations will be observed.

3.0 SAFETY AND ORIENTATION MEETING

ERI field personnel and subcontractors will attend a safety and orientation meeting (meeting) for safety issues and will review the project tasks before beginning work. The meeting will be led by the Project Manager or Site Safety Officer. In addition, positive and negative seal checks of respiratory protective devices will be conducted as part of the safety orientation meeting when the use of a respirator may be required.

3.1 Employee Training

During the safety and orientation meeting described in Section 3.0, the Site Safety Officer will confirm all employees and subcontractors working on site have the following current certifications of employee training depending on work being performed and exposure risk.

1) **40-hour HAZWOPER card or certificate:** Initial (with three days of documented supervision) or refresher card for general site workers. These workers engage in hazardous substance removal or other activities **which expose or potentially expose** workers to hazardous substances.
2) **Workers who are engaged in activities which will not expose or potentially expose** workers to hazardous substances over the permissible exposure limits (PELs) are not required to have HAZWOPER certification. Workers will not be exposed to impacted vapor, soil or water (groundwater included) or enter remediation compounds. Typical activities where this would occur are subcontractors for: land surveying, geophysical surveying, landscaping services, asphalt/concrete work (does not include saw cutting), crane operations, and deliveries of equipment or materials.
3) **Current LPS Certification:** Current Loss Prevention System (LPS) certification is required for all workers used more than once per quarter and must have a Valid Loss Prevention Training (LPS) signed training card. Subcontractors who are not used more than once per quarter require having LPS light conducted. The Site Safety Officer will conduct LPS light for these infrequent subcontractors. Certification cards are not required for equipment or material delivery services, such as Federal Express, UPS, or rental equipment, or regulatory agency representatives, and property owners.

Employees or subcontractors who cannot provide proof of training **are not allowed** on site or within the exclusion zone and **are not permitted to conduct any work**.

3.2 Site Visitors

Any non-ERI or subcontractor personnel who wishes to gain access to fenced off-site or established exclusion zones when work is occurring at an active facility open to the public are required to attend the safety and orientation meeting and meet all other requirements listed within this site safety plan, such as proof of training and proper personal protective equipment (PPE).

Authorized visitors to the site or the exclusion zone are the client and federal, state, or local government agents. If visitors do not meet minimum requirements, they **are not allowed** on site or within exclusion zones.

3.3 Emergency Relocation Area

In the event that there is an emergency where a fire, significant release, or safety hazard exists at the site, all personnel will assemble at the location identified during the safety and orientation meeting. Factors to consider are: direction of wind (locate up wind), proximity to traffic (should not be in the way of emergency vehicles or exposed to street vehicle hazards), and location of emergency (should not be down hill where a release could move towards you).

3.4 Work Permit System

Evaluation of site activities may require the issuance and compliance with ExxonMobil's work permit system. A blank work permit is included in Appendix G of this site safety plan. Work permits are issued for the following job activities:

1) Confined Space or Permit Required Confined Space Entry.
2) Hot Work.
3) Excavation Work.
4) Cold Work.
5) Gas Testing.
6) Energy Control ("Lockout / Tagout").

The permit system description and detailed instructions and definitions of permit required tasks are also included in Appendix G in the document titled "Global Remediation Work Permit Document." Any additional questions should be directed to your project manager.

4.0 HAZARD RISK ASSESSMENT

4.1 General

The major hazards expected to be encountered on this project are addressed in the task-specific Job Safety Analysis (JSA) included in Appendix E of this site safety plan. The JSAs, depending on the task(s), may list additional PPE not shown here in the general site safety plan. Wear the highest level of protection prescribed by either document.

The major chemicals expected to be encountered on this project are fuel-related hydrocarbon compounds. Anticipated chemicals and their exposure standards are listed in Table 1.

Potential levels of exposure are not anticipated to reach the PEL or threshold limit values (TLV). Inhalation and dermal contact are the most prevalent exposure pathways. Protective clothing will be mandatory for field personnel as specified in this plan.

Respiratory protective devices are required to be worn by each person on site or to be within easy reach should monitoring of the breathing air approach any PELs or irritating odors are detected or irritation of the respiratory tract occurs.

Hearing conservation program adherence is mandatory to be in compliance with this site safety plan. The anticipated level and duration of noise exposure and which hearing protective devices will be worn will be discussed during the safety and orientation meeting.

4.2 Biological

For the purposes of this health and safety plan, biological hazards are discussed in general terms such as venomous snakes, stinging and biting insects, and infectious agents from animal droppings. It is important for employees to discuss known local biological hazards.

4.2.1 Venomous Snake Safe Practices

How to Avoid Snake Bites

- Do not handle snakes! A person may be bitten when holding a snake or when attempting to pick it up or kill it.
- Never play with or tease snakes! Remain at a safe distance more than two snake body lengths away. Most snakes can strike and hit at a distance of half their length.
- Keep hands and feet out of areas into which you can not see. "Sweep" or prod around blind areas at low levels with a stick, especially if it is a warm area around vibrating equipment.
- Do not pick up a "dead" snake. It may only be injured, stunned, or playing dead.

Proper Procedures for Treatment of Snakebites

- Keep the victim calm. Have him or her lie flat with little movement. Treat for shock.
- Wash the bite with soap and water.
- Contrary to popular belief, **do not** use a knife to cut an "X" on the fang wounds to suck out the venom - this doesn't work!!
- Immobilize the bitten limb, using a splint if needed, and position the limb well below the level of the heart. A bandage wrapped 2 to 4 inches above the bite may help slow the venom. The bandage should not cut off blood flow from a vein or artery. A good rule of thumb is to make the band loose enough that a finger could slip under it.
- If the victim has collapsed or is not breathing, call 911.
- Get the victim to a hospital as soon as possible, lying flat with the bitten appendage kept below heart-level.
- If possible, get a description of the snake so that the doctor will know which anti-venom to use. Injecting the wrong anti-venom is useless and will endanger the victim.

4.2.2 Stinging and Biting Insects

While everyone considers being bitten or stung by an insect unpleasant, we need to be aware of the more serious ramifications of such events. Here are a few tips on how to avoid being bitten or stung.

- Wear long sleeves, neck covering and pants.
- Wear white or light colors.
- Do not wear cologne or perfume.
- Use insect repellent.
- Do not swat at insects.
- Wear gloves.
- Do not reach under objects that you have not inspected first.

One serious consequence of insect stings is anaphylaxis, a severe life-threatening allergic reaction. Symptoms of anaphylaxis include: feeling faint or passing out, difficulty breathing, swelling of the tongue, hives, wheezing, and/or coughing. Symptom onset may occur within seconds and usually within twenty minutes. Individuals who have had severe reactions to previous stings should keep an anaphylaxis kit (e.g., Ana-Kit or Epi-Pen) nearby if there is any risk of a sting. If stung, epinephrine should be injected into the muscle of the upper outer thigh. Application of ice to the sting location can help minimize the affects of the poison as well taking an over the counter antihistamine.

4.2.3 Infectious Agents

Serious illness can occur after exposure to various infectious agents found in some rodent and bird droppings. One situation to be concerned about is a site covered in large amounts of droppings from rodents or pigeons. This situation typically occurs at closed or vacant sites where structures have not been occupied for a long period of time.

When droppings are disturbed, in addition to dust and other materials becoming airborne, various fungi, bacteria, and viruses are also typically put into the air, which can be breathed in by the worker. Prohibited actions include:

- Entering buildings with visible dropping on horizontal surfaces.
- Dry sweeping in locations where bird and rodent dropping are present.

Three human diseases are known to be associated with pigeon droppings: histoplasmosis, cryptococcosis, and psittacosis. Hantavirus Pulmonary Syndrome (HPS), a rodent related infection, is a potentially deadly respiratory illness caused by certain types of hantaviruses, which are viruses found in the saliva, urine, and droppings of some rodents.

When large quantities of droppings are present, stop work and have the site evaluated. Have the droppings removed and disposed of by a professional before continuing work.

4.2.4 Blood Borne Pathogens

Treat all human blood and body fluids as if they are infected. Take the following precautions when assisting someone when there is the potential to come into contact with bodily fluids:

- Cover cuts, rashes, and broken skin.
- Wash your hands and exposed skin with soap and water or an alcohol-based disinfectant handrub immediately after exposure to infectious fluids.
- Use a disinfectant solution to clean and decontaminate any area where fluids have spilled.
- Avoid splashes and spills of body fluids.
- Use a pocket mask or other protective device if performing cardiopulmonary resuscitation (CPR).

4.3 Assured Grounding Program

At no time is an ERI or subcontractor of ERI to jeopardize themselves by using electrical equipment without being tested and approved for ground fault circuit interruption equipment (GFCI). All 120-volt, AC, single-phase, 15- and 20-ampere receptacle outlets will have approved ground-fault circuit interrupters for personnel protection. Receptacles on a two-wire, single-phase portable, or vehicle-mounted generator rated not more than 5 kilowatts (KW), where the circuit conductors of the generator are insulated from the generator frame and all their grounded surfaces, will also require ground-fault circuit interrupt.

This Assured Equipment Grounding Conductor Program (AEGCP) will be used in conjunction with GFCIs for ground-fault protection. The following minimum requirements apply:

- Document during the safety and orientation meeting where and when electrical equipment is to be used. If so, document the condition of the equipment on the form for future reference.
- The Site Safety Officer is to conduct the inspections of electrical equipment prior to each use.
- The inspection will cover all cord sets, attachment caps, plugs, receptacles, and any equipment connected by a cord and/or a plug. If any external damage (e.g., deformed or missing pins, damaged insulation) or internal damage is found, take the equipment out of use until it is repaired.

4.4 Chemical Descriptions/Exposure

This section describes the prevalent chemical compounds found in fuel-related hydrocarbons. It provides the chemical name, a physical description, fire or explosion hazards, incompatible materials, common exposure symptoms, target organs affected, and routes of exposure. Refer to the material safety data sheets in Appendix C for more information on select chemicals.

4.4.1 Benzene

Benzene is a colorless, aromatic liquid. Benzene may create an explosion hazard. Benzene is incompatible with strong oxidizers, chlorine, and bromine with iron. Benzene is irritating to the eyes, nose, and respiratory system. Prolonged exposure may result in giddiness, headache, nausea, staggering gait, fatigue, bone marrow depression, or abdominal pain. Routes of entry include inhalation, absorption, ingestion, and skin or eye contact. The target organs are the blood, the central nervous system (CNS), skin, bone marrow, the eyes, and the respiratory system. Benzene is carcinogenic.

4.4.2 Ethylbenzene

Ethylbenzene is a colorless, aromatic liquid that may create an explosion hazard. It is incompatible with strong oxidizers. Ethylbenzene is irritating to the eyes and mucous membranes. Prolonged exposure may result in headache, dermatitis, narcosis, or coma. Routes of entry include inhalation, ingestion, and skin or eye contact. The target organs are the eyes, the upper respiratory system, the skin, and the CNS.

4.4.3 Toluene

Toluene is a colorless, aromatic liquid. Toluene may create an explosion hazard. Toluene is incompatible with strong oxidizers. Prolonged exposure may result in fatigue, confusion, euphoria, dermatitis, or photophobia. Routes of entry are inhalation, absorption, ingestion, and skin or eye contact. The target organs are the CNS, the liver, the kidneys, and the skin.

4.4.4 Xylene Isomers

Xylene is a colorless, aromatic liquid. Xylene may create an explosion hazard. Xylene is incompatible with strong oxidizers. Xylene is irritating to the eyes, nose, and throat. Prolonged exposure may result in dizziness, excitement, drowsiness, staggering gait, corneal vacuolization, vomiting, abdominal pain, or dermatitis. Routes of entry are inhalation, absorption, ingestion, and skin or eye contact. The target organs are the CNS, the eyes, the gastrointestinal tract, the blood, the liver, the kidneys, and the skin.

4.4.5 Methyl Tertiary Butyl Ether

Methyl tertiary butyl ether (MTBE) is a colorless, aromatic liquid that can create an explosion hazard. It is incompatible with strong oxidizers and acids. Inhaling vapors can irritate the respiratory tract and cause CNS defects. Breathing high concentrations in the air can cause lightheadedness, dizziness, weakness, nausea, and headache. Routes of entry are ingestion and skin and eye contact. MTBE is a potential human carcinogen.

4.4.6 Naphthalene

Naphthalene is a colorless to brown solid with an odor of mothballs. Naphthalene is a flammable solid, which is highly reactive with oxidizing agents. It is very hazardous in case of ingestion. It is hazardous in eye contact, inhalation, and skin contact as an irritant. It is toxic to the blood, the kidneys, the CNS, the liver, the mucous membranes, the gastrointestinal tract, and the upper respiratory tract. Routes of entry are dermal contact, eye contact, inhalation, and ingestion. Naphthalene is a carcinogen.

4.4.7 Ethanol

Ethanol is a colorless liquid with a pleasant alcoholic odor detectable at 49 to 716 parts per million (ppmv). Ethanol is an extremely flammable liquid and vapor. In vapor form, it can flash fire. It is stable under normal ambient conditions. Avoid mixing with strong oxidizing agents. Ethanol is an eye irritant and contact may cause stinging, watering, redness, and/or swelling. Skin contact may cause redness, itching, burning, and skin damage. There is low to moderate exposure of toxicity through inhalation and ingestion. Effects of overexposure may include irritation of the nose and throat, irritation of the digestive tract, nausea, vomiting, flushing, transient excitement followed by signs of nervous depression (e.g., headache, drowsiness, dizziness, loss of coordination, disorientation, and fatigue), blurred vision, drunkenness, stupor, tremors, respiratory failure, unconsciousness, convulsions, and death. Target organs are the CNS, the stomach, the liver, the male reproductive system, and the heart.

4.4.8 Tetraethyl lead

Tetraethyl lead is a colorless liquid or is dyed red, orange, or blue with a slight musty odor. It is a class two flammable combustible liquid. Vapors may travel back to source and flash back. It is not compatible with oxidizing agents and class three reactive materials, and it may explode in a fire. Symptoms of exposure are irritation to the eyes, with possible loss of vision, and irritation to the nose and throat, causing coughing and wheezing. High exposure can cause headaches, irritability, reduced memory, disturbed sleep, tiredness, personality changes, convulsions, and death. Repeated exposure can lead to lead poisoning. Target organs are the blood cells, the brain, and the kidneys. Routes of exposure are inhalation, dermal contact, and ingestion.

4.4.9 1,2-Dibromoethane or Ethylene Dibromide

1,2-dibromoethane (EDB) is a colorless liquid or solid with a mild sweet odor detectable at 10 ppmv. EDB is non flammable. In liquid form it is not compatible with magnesium and aluminum; strong alkalis and alkali metals may cause violent chemical reaction. Polypropylene, polyvinyl chloride, and rubber are incompatible. EDB is an irritant to the eyes, the respiratory tract, and the mucous membranes. Inhalation causes headaches, decreased appetite, inability to sleep, nausea, and dizziness. Dermal contact may result in intense burning pain and blistering. EDB targets the dermal, the lungs (pulmonary edema), the liver, and the kidneys. Routes of exposure are inhalation, dermal contact, and ingestion

4.4.10 1,2-Dichloroethane or Ethylene Dichloride

1,2-dichloroethane (1,2-DCA or EDC) is a clear liquid with a sweet odor like chloroform. It is a solvent and wetting agent. It is flammable but otherwise stable. 1,2-DCA should be handled with extreme caution as a carcinogen. It is extremely hazardous when ingested, very hazardous as an eye irritant, and is an irritant for inhalation and skin contact. It is corrosive to the skin and the eyes on contact and causes tissue damage when misted to mucous membranes of the eyes, the mouth, and the respiratory tract. Skin contact may produce burns.

4.4.11 Asbestos

Asbestos is a naturally occurring mineral. It is distinguished from other minerals by the fact that it crystals form long, thin fibers. Asbestos is broken into two groups: amphiboles and serpentine. Chrysotile is the only mineral in the serpentine group and is the most common form of asbestos used in building products. It is known as white asbestos. Asbestos is non-flammable. It is non reactive Asbestos causes the lung disease asbestosis, cancer, and mesothelioma.

4.4.12 Hydrogen Sulfide

Hydrogen sulfide is a colorless, flammable, extremely hazardous gas with a "rotten egg" smell. It occurs naturally in crude petroleum and natural gas, and can be produced by the breakdown of organic matter and human/ animal wastes (e.g., sewage). It is heavier than air and can collect in low-lying and enclosed, poorly ventilated areas such as basements, manholes, sewer lines and underground telephone/electrical vaults. Hydrogen sulfide gas meters require daily bump testing.

4.4.13 Boron

Boron metal powder is highly reactive. Dust may ignite spontaneously in air. Powder oxidizes slowly at room temperature. Boron metal may emit toxic fumes if involved in a fire. May ignite on contact with gaseous chlorine or fluorine at room temperature. May react exothermically with metals above 900 ^{o}C. May react explosively when ground with lead fluoride or silver fluoride. May explode with hydrogen iodide. Boron compounds are very toxic and therefore considered an industrial poison. Boron is one of a group of elements, such as Pb, Mn, As, which effects the central nervous system. Boron poisoning causes depression of the circulation, persistent vomiting and diarrhea, followed by profound shock and coma. The temperature becomes subnormal and a scarlatina form rash may cover the entire body.

4.4.14 Tetrachloroethylene (PCE)

Tetrachloroethylene (PCE) is a colorless liquid with a sweet odor detectable at a concentration of 1 ppm. It is an excellent solvent for organic materials and is widely used in dry cleaning and to degrease metal parts and as a paint stripper and spot remover. Tetrachloroethylene is non-flammable. It is hazardous in case of skin contact (irritant) and in case of inhalation. It is slightly hazardous in case of eye contact (irritant) and ingestion. Probable carcinogenic.

4.4.15 Trichloroethylene (TCE)

Trichloroethylene (TCE) is a clear non-flammable liquid with a sweet smell. It is commonly used as an industrial solvent. It is hazardous in case of skin contact (irritant, permeator), of eye contact (irritant), of ingestion and of inhalation. It is toxic to kidneys, the nervous syste, liver, heard and the upper respiratory tract. Probably carcinogenic.

TABLE 1 EXPOSURE LIMITS OF ANTICIPATED CHEMICALS

Chemical	PEL[A]	TWA[A]	STEL[A]	IDLH
H2S	10	5	10	100
Boron	15[B]	10[B]	---	
Benzene[1] [skin] & [carc]	1	0.1	1	
Ethylbenzene [skin]	100	100	125	
Gasoline[2]	300	300	500	
Toluene [skin]	50	100	150	
Xylene [skin] (m, o, & p isomers)	100	100	150	
Methyl Tertiary Butyl Ether [carc]	40	40	---	
Naphthalene	10	10	15	
Ethanol [skin]	1,000	1,000	---	
Tetraethyl lead [skin]	0.075[B]	0.075[B]	---	
1,2-Dibromoethane [carc] [skin]	0.13	0.045	0.13	
1,2-Dichloroethane [carc] [skin]	1.0	1.0	2.0	
Asbestos	0.1[C]	0.1[C]	---	
Tetrachloroethylene (PCE)	100	25	100	
Trichloroethylene (TCE)	100	50	100	

IDLH = Immediately dangerous to life and health.
PEL = Permissible exposure limit: 8-hour, time-weighted average (Occupational Safety and Health Administration [OSHA]).
TWA = Time-weighted average: 8 hour, [same as TLV], American Conference of Governmental Industrial Hygienists [ACGIH]).
STEL = Short-term exposure limit: 15 minute time-weighted average (ACGIH).
[carc] = Substance identified as a suspected or confirmed carcinogen.
[skin] = Substance may be absorbed through the skin, the mucous membranes, or the eyes.
1 = Federal OSHA benzene limits given for PEL and STEL; STEL has a 50-minute duration limit.
2 = Federal OSHA gasoline limit given for PEL; STEL is the same for FED-OSHA and ACGIH.
--- = No exposure limits published for the listed chemical.
A = All chemical concentrations are in parts of gas or vapor per million parts air (ppmv) unless otherwise noted.
B = Milligrams of substance per cubic meter of air (mg/m^3).
C = Measured as fiber per cubic centimeter of air.

These brief descriptions of the physical characteristics, incompatibilities, toxic effects, routes of entry, and target organs were summarized from the *NIOSH Pocket Guide to Chemical Hazards*. This information is used in safety and orientation meetings to alert personnel to the hazards associated with expected contaminants.

4.5 Fall Protection

All employees who use ladders (fixed or extension) or work from elevated platforms where the distance to the next level below is greater six feet will implement fall protection and safe work practices described in the following subsections.

4.5.1 Ladder Safety

- All ladders will be inspected before use, any damage or missing slip resistant shoes, lose or missing rungs, for A frame ladders damaged or missing locks will render the ladder inoperable and be tagged and removed from service.
- Metal/conductive ladders will not be used around electrical work or overhead lines.
- Manufacturer information must be legible and followed in order to use the ladder.
- Extension ladders must maintain the 4:1 ratio, must extend 3 feet above elevated surface and be tied off or secured by a second person.
- A frame warning must be followed and not work above manufacturer recommendations.
- A frame ladders must be completely extended and locked out before use.
- All ladders must be set on firm surfaces, clear of obstructions, and not on slick surfaces.

- Weight limits of ladders must be followed and to include any tools or materials being carried.
- Three points of contact (two hands with one leg or one hand with two legs) must be maintained at all times when climbing up or down the ladder.
- Ladder must be faced at all times.

4.5.2 Elevated Platforms

Elevated platforms for the purposes of this site safety plan will include work on scaffolds, aerial-lifts, man-baskets, powered industrial trucks, roofs, ladder jacks, raised platforms, unprotected edges, and openings in floors where workers will be able to fall six feet.

- All workers who will be working where a fall is equal or greater than six feet will be trained on how to work on that surface safely, (i.e., trained operator of scissor- or aerial-lifts)
- All workers are required to use, to know how to use and inspect personal fall arrest and/or restraint systems.
- Fall protection systems must be used in accordance with manufacture and/or regulatory requirements: guard rail, safety nets, personal fall arrest, personal fall restraint, and positioning device systems.
- Fall arrest or restraint systems will be anchored to support 5,000 pounds (lbs) and 3,000 lbs per worker.
- A competent person must install, build or operate any equipment or structure where workers are at risk of falling. Proof of competency must be provided before work beings in accordance with Federal and State OSHA standards. Typical proof is a wallet card stating worker met the training requirements for that specific area of expertise

5.0 GENERAL PROJECT SAFETY REQUIREMENTS

Project activities will be conducted in accordance with the following minimum safety requirements:

- Eating, drinking, and smoking will be restricted to a designated area.
- All personnel will be required to wash their hands and faces before eating, drinking, smoking, or applying cosmetics in the aforementioned designated areas.
- Gross decontamination and removal of all PPE will be performed before leaving the site. Contaminated clothing will be removed and collected in a drum for disposal.
- Shaking or blowing dust or other materials off potentially contaminated clothing or equipment to remove dust or other materials is not permitted.
- The Site Safety Officer will be responsible for taking steps to protect employees from physical hazards including:

    - Falling objects, such as tools or equipment.
    - Falls from elevations.
    - Tripping over hoses, pipes, tools, or equipment.
    - Slipping on wet or oily surfaces.
    - Insufficient or faulty protective equipment.
    - Insufficient or faulty equipment or tools.

- Field personnel will be cautioned to inform each other of the non-visual effects of the presence of toxins, such as:

    - Headaches.
    - Dizziness.
    - Nausea.
    - Blurred vision.
    - Cramps.
    - Irritation of eyes, skin, or respiratory tract.

- o Changes in complexion or skin discoloration.
- o Changes in apparent motor coordination.
- o Changes in personality or demeanor.
- o Excessive salivation or changes in pupillary response.
- o Changes in speech ability or pattern.

6.0 PROTECTIVE EQUIPMENT REQUIREMENTS

The PPE mentioned in this site safety plan is meant protect employees from the general construction hazards as well as the chemical exposure hazards described in Section 4.0. Respiratory protection is covered in section 7.0, while inspection and donning and doffing procedures for gloves and Tyvek™ are included in Appendix F.

All PPE shall be maintained and stored in a clean environment. Where the shape of the PPE is critical for use, a hard container shall be used for storage to maintain integrity. No defective or heavily soiled PPE shall be worn while performing work. In the event that PPE becomes torn or damaged during use, it will be replaced immediately upon exiting the exclusion zone and after any required decontamination is completed, as described in Section 12.0.

Field personnel, subcontractors, and visitors are required to wear the following protective clothing and equipment as a minimum **while in the work area at the job site**:

- Class II ANSI Rated 107-2004 Traffic safety vest.
- Safety glasses meeting ANSI standard ANSI Z87.1-2003.
- Safety goggles meeting ANSI standard ANSI Z87.1-2003 [When working in/with exposed soil]
- Safety-Toe footwear, meeting ANSI standard Z41.1-1967.
- Cut resistant Gloves Level 3 or better must be on person at all times.
- Hearing protection (as dictated Section 8.0).

Field personnel **engaged** in work are required to wear the following equipment:

- Hard hat.* **
- High visibility safety vest/clothing (Class II or Class III ANSI rate vest, Standard 107-2004***)
- Safety glasses.
- Safety-Toe footwear, meeting ANSI standard Z41.1-1967
- Standard Tyvek™ coveralls (when potential for impacted soil, water, or dust hazard exists or when mandated by the Site Safety Officer).
- Respirator with P-100 and organic vapor cartridges (if lowest PEL or TLV is exceeded in the breathing zone or the Site Safety Officer decides respirators should be worn).
- Hearing protection (as mandated in Section 8.0 of this plan).
- Hand protection as based on task specific JSA (Appendix E). At a minimum, level three cut resistant for all site activities and chemical resistant for listed chemical exposure).
- Arm and neck covering when working in vegetative areas
- Temperature variations are to be considered when wearing PPE. Appendix A “Heat Stress” and Appendix B “Cold Stress” shall be reviewed prior beginning work to establish warning signs of exposure and adequacy/hazards of protection.

*Exception to PPE Requirement: If there is **no potential exposure** to overhead hazards, falling or flying debris, or electrical shock hazards, **the hard hat is not required** to perform the job tasks described in this site safety plan; however, considerations should be made to take into account exposure to weather elements such as sun exposure and high heat conditions.

**Short Service Employee of less than 1-year must were orange colored hardhat or ball cap if no over overhead hazards, falling or flying debris, or electrical shock hazards are present.

***Class II reflective clothing is to be worn where employees are exposed to vehicle traffic up to 50 miles per hour (mph). Class III reflective clothing is to be worn when employees are exposed to traffic speeds in excess of 50 mph.

7.0 RESPIRATORY PROTECTION PROGRAM

This section summarizes the ERI Respiratory Protection Program. ERI subcontractors must have company medical surveillance and respiratory protection programs including adequate training of their employees. Subcontractors must provide PPE as required in this site safety plan for their employees. ERI will attempt to verify worker training but does not assume the responsibility of the employer in any way. The following subsections outline the ERI Respiratory Protection Program.

Respirators are not issued to employees until the company physician conducts a complete physical and decides the employee can wear PPE and a respirator. After the physician has issued written approval to ERI, the Health and Safety Coordinator will conduct the required training including these basic topics:

- Applicable OSHA regulations 1910.134 and 1910.120 and CCR Title 8, Section 5192 and 5144.
- Nature of respiratory hazards to be encountered in the work environment and how to select proper respiratory equipment.
- Use of respirators and proper fitting.
- Functions and limitations of respirators.
- Cleaning, disinfection, inspection, maintenance, and storage of respirators.

7.1 Functions and Limitations of Respirators

Respirators are not intended for and may not be used in atmospheres that are, or may become, immediately dangerous to life or health or in atmospheres where the identity or concentration of the chemical(s) is unknown. Respirators may not be used in atmospheres containing less than 19.5% oxygen.

Cartridges or canisters for respirators are selected and supplied to employees by the Health and Safety Coordinator. The failure to choose or use a respirator equipped with cartridges or filters suitable for the chemicals(s) in the atmosphere or likely to be released in the atmosphere may result in the respirator providing little or no protection against the contaminated atmosphere. The site safety plan specifies the chemicals(s) to be encountered and the type of cartridge or canister appropriate for personal protection.

Assuming that the respirator is properly fitted, in good condition, free from leaks, and has the proper cartridges for the contaminant(s) present, the length of time the respirator will provide protection also depends on the conditions of use.

The conditions of use include, but are not limited to, the following:

- The concentration of chemical(s) in the atmosphere.
- The temperature and humidity of the ambient atmosphere.
- Any previous use of the cartridges and filters.
- The elapsed time since the removal of the cartridges or filters from their protective packaging.
- The emotional state of the wearer.
- The level of physical activity of the wearer.

Cartridges designed and specified to protect the wearer against airborne particles are not appropriate for protection against gases and vapors. Cartridges designed and specified for protection against specific gases and vapors are not appropriate for protection against airborne particles or other gases or vapors beyond the

scope of that type of cartridge. If the label is missing or the type of cartridge is inappropriate, the cartridge may not be used under any circumstances; it will provide little or no protection to the wearer.

Cartridge schedule for petroleum related hydrocarbons require a single shift changeout, unless breakthrough indicators require an earlier changeout. Do not reuse cartridges after the packaging is removed or the cartridge has been used for respiratory protection. Reuse of cartridges can cause exposure since petroleum hydrocarbons will desorbs off the respirator if left over night.

Breakthrough Times (minutes)

Name	**Constituent Concentration (ppm)**				
	50	**100**	**200**	**500**	**1,000**
Benzene	Work Shift	Limited to a maximum concentration of 50 ppm for negative pressure APR			
	See the Benzene Standard - 1910.1028(g)				
Toluene	1,018	562	307	135	72
Ethylbenzene	1,133	604	319	135	70
m-Xylene	1,143	608	321	136	70
Ethanol	123	105	85	60	43
1,2-Dichloroethane	482	310	194	101	60

1. Cartridge use rates we based on normal breathing rates, increase in activity such as heavy lifting or shoveling will reduce the life span of the cartridge. Be prepared for more frequent cartridge changeouts (two per shift).
2. Humidity will reduce the lifespan of the cartridge; decrease the time allotment by a factor of 2 when humidity exceeds 65%.
3. 480 minutes equals an 8-hour work shift time frame.
4. Work Shift Indicates that the service life for this constituent is limited to a single work shift by the OSHA Standard.

7.2 Danger Signals Indicating Possible Respirator Failure

If any of the danger signals in the following list are experienced while wearing a respirator, immediately return to a fresh air environment. The cartridges or filters may be inappropriate or used up, or abnormal conditions may be creating vapor concentrations which are beyond the limits of the cartridges or filters. Danger is indicated when the individual subject to exposure:

- Smells or tastes chemicals or if eyes, nose, or throat become irritated.
- Has difficulty breathing.
- Notices that the breathing air becomes uncomfortably warm.
- Experiences headaches, dizziness, cramps, nausea, or blurred vision.
- Experiences changes in complexion or skin discoloration.
- Experiences changes in motor coordination, personality, or demeanor.
- Experiences changes in speech ability or pattern.
- Experiences excessive salivation or changes in pupillary response.

7.3 Positive and Negative Respirator Pressure Seal Checks

Qualitative seal check testing of each respirator must be conducted before the respirator may be used to ensure a good fit is obtained. The following steps should be taken in qualitative seal checks of the respirator:

- Don the face piece with cartridge or filters in place. Pull straps together equally to avoid distorting the mask.
- Adjust the face piece. Do not over-tighten it.

- Negative pressure seal check: Close off both inlet connections with palms of hands, inhale slowly, and hold breath momentarily. No leakage should be detected, and the face piece should be drawn slightly to the face.
- Positive pressure seal check: Close opening in the exhalation valve guard by placing palm of one hand over face of guard; exhale slowly maintaining slight positive pressure. No leakage should be detected between the face seal and the face.
- Should any leakage be noted:

    - Adjust the head straps and face piece slightly; recheck for leakage.
    - Check condition of exhalation valve and seat. Check that both inlet gaskets are present and in proper condition.
    - In the event the face piece cannot be adjusted so there is no leakage, **do not enter the area requiring protection**. Due to your particular facial features, a different style or size face piece may be required to obtain a proper facial fit.

Note: Failure to perform qualitative seal checks of the respirator each time the respirator is donned may result in little or no respiratory protection.

7.4 Inspection, Cleaning, and Storage

The respirator should be inspected, cleaned, and properly stored after use each day. The steps listed in the following subsections are the basic elements of each procedure.

Inspection

- Examine face seal for rips, tears, holes, deformation, or stiffness.
- Examine face piece plastic center shell for cracks, missing components, or damaged threads.
- Examine harness for breaks, cuts, frays, tears, and missing or damaged hardware.
- Examine inhalation and exhalation valves and valve seats for cuts, cracks, or foreign matter which may not allow the valve to close completely. Check that valves are properly installed and are not distorted.
- Examine cartridges for signs of abuse or damage. Discard damaged items.
- Any respirator malfunction or deficiencies noted must be reported to the Health and Safety Coordinator who will issue a new respirator or correct the deficiencies using only approved spare parts from the manufacturer of the specific model in need of repair. Spare parts from any other manufacturer may not be used under any conditions. Instructions in the manual provided by the manufacturer should be followed when the respirator needs repairing or replacing.

Cleaning

- Unthread cartridges or filters.
- Wash the face piece with warm water and a mild detergent after each use.
- Disinfect the face piece if it was used by another person. The mask should routinely (once per month) be disinfected even if the respirator is used solely by one individual. A hypochlorite solution may be used (i.e., 2 tablespoons chlorine bleach per gallon of water for an acceptable solution).
- After cleaning and air-drying, check that the face piece is not damaged and that components removed prior to cleaning have been installed properly.

Storage

- Place the respirator in its storage box in a heat-sealed or re-sealable plastic bag. Store the respirator in a flat position to prevent the face seal from taking a permanent “set.”
- Replacement components should be stored in sealed packages in a cool, clean, low-humidity location until ready for use.

The Health and Safety Coordinator will explain ERI's Respiratory Protection Program to each new employee who must wear a respirator. The employee will be asked whether or not he or she understands the information provided. If the company physician has cleared the employee for respirator use and the Health and Safety Coordinator has checked the fit of the respirator, the employee will then be issued a respirator. A written record is signed and dated by the employee and Health and Safety Coordinator and kept in the new employee's Safety Record.

8.0 HEARING CONSERVATION PROGRAM

This section summarizes the ERI Hearing Conservation Program. ERI employees and subcontractors must have hearing protection available on site for working conditions that can result in hearing damage. Due to the changing working environment, engineering controls are typically not applicable to mitigate noise in the field environment; therefore, hearing protection such as plugs, canal blocks, or muffs are employed. Subcontractors must provide PPE as required in this site safety plan for their employees. ERI will attempt to verify worker training but does not assume the responsibility of the employer in any way. The following subsections outline the ERI Hearing Conservation Program. ERI's the Health and Safety Coordinator will conduct the required training, including these basic topics:

- Applicable OSHA regulation 1910.95 and CCR Title 8, Section 5095-5100.
- Audiometric testing program (initial and annually thereafter).
- Training on the use of hearing conservation devices and their limitations.
- Nature of noise hazards to be encountered in the work environment.
- Length of time noise exposure can occur which will result in hearing damage.

Anytime during work when the decibel (dB) noise level exceeds 85 over a time weight average of eight hours requires the Hearing Conservation Program. For noise measurements greater than 85 dB, the exposure periods are shown on the following table.

Daily Duration (Hours)	Sound Level dBA Slow Response
8	90
6	92
4	95
3	97
2	100
1 ½	102
1	105
½	110
¼ or less	115
None acceptable	>140

Table provided from 29CFR 1910.95, Table G-16

Hearing protection devices are not all created equal. Each manufacturer establishes a noise reduction rating (NRR) for their product. The NRR is established by evaluating hearing protectors under laboratory conditions specified by the American National Standards Institute in ANSI S3.19-1974. OSHA's experience and the published scientific literature indicate that laboratory-obtained real ear attenuation for hearing protectors can seldom be achieved in the workplace. Based on the type of noise exposure anticipated (see Appendix D for typical noise ratings on commonly used powered hand tools), use the following equations to determine if the hearing protection is adequate.

A common method used for **single protection** (either muffs or plugs) is as follows:

- Determine the laboratory-based noise attenuation provided by the hearing protection device (HPD). This is the NRR and is listed on the packaging.
- Subtract seven from the NRR to account for spectral uncertainty divide that number by two and subtract that number from the A-weighted TWA workplace noise level, as follows:

- **Estimated Exposure (dBA) = TWA (dBC) – [(NRR-7)/2]**

For **dual protection** (ear muffs and plugs are used simultaneously) use the following:

- Determine the laboratory-based NRR for the **higher** rated protector (NRR).
- Subtract 7 dB from NRR if using A-weighted sound level data.
- Add 5 dB to the field-adjusted NRR to account for the use of the second hearing protector.
- Subtract the remainder from the TWA as follows:

- **Estimated Exposure (dBA) = TWA (dBA) - [(NRR_h- 7) + 5]**

In either case, if the noise reduction level is protective of hearing (less than 90 dB for an 8-hr work day), move forward with the work. In the event that the noise reduction does not provide adequate hearing protection, contact your manager and do not proceed with the work.

For subcontractors using heavy equipment, it is their responsibility to provide the dBA noise level measurements for their equipment.

9.0 WORK ZONES AND SECURITY MEASURES

This section describes the work zone requirements for keeping the public and employees safe by identifying where the exclusion zone exists. Security measures for the protection of workers on site and client and contractor materials, equipment, and structures are described in the following subsections.

9.1 Work Zones

Cones, high-visibility fencing, delineators with caution tape, barricades, or a suitable alternative will be used to deny public access to the critical zone or the area where work is being performed. Cones and warning signs will also be used to define an exclusion zone which redirects motorists and pedestrians away from the critical zone. The general public will not be allowed close to the work area under any conditions. If for any reason the safety of a member of the public (e.g., motorist or pedestrian) may be endangered, work will cease until the situation is remedied.

Work zones will be established based on traffic control figures created for the site work. Please reference the traffic control plan figure 2.

For sites where public or workers need to be informed of possible hazards, the site will be posted with any applicable signs. For example:

- Hard hat required
- No Smoking
- Prop 65 (California Only)
- OSHA Construction Bill of Rights Notice
- Hearing Protection Required
- Authorized Personnel Only

9.2 Site Security

Site security measures require employees to be aware of their surroundings at all times. Site security does not require additional personal or private security to conduct the work described in the site safety plan. Work will not take place at night therefore security fencing is not required.

Managing equipment on site while working requires employees and subcontractors to keep tools and equipment secured while not being used. This includes locking truck utility beds.

Prior to leaving the site, ensure all fences are locked, equipment is secured and materials are not left out in the open to provide an easy theft opportunity. No equipment will be left on-site.

10.0 EXPOSURE MONITORING

It is not anticipated that project personnel exposure will exceed the TLVs or PELs of the materials; however, in the event it is anticipated that exposure limits could be exceed in the working area and breathing zones, ERI will implement engineering and administrative controls prior to donning respirators. In the event these controls are impractical or ineffective in sufficiently lowering the air contaminant levels, respirators will be used within the established protection factors and oxygen levels.

10.1 Lead

If site conditions indicate the possibility of elevated lead levels, air monitoring will be performed to determine whether personnel are exposed to airborne concentrations above the CAL-OSHA Action Level (30 micrograms per cubic meter [µg/m^3]) for lead. Portable air sampling pumps will be used with 37 millimeter, 0.8 micro (µ) Mixed Cellulose Ester (MCE) filter cassettes. At least one full-shift (7 hour minimum) personal air sample will be taken for each job classification in each work area. Monitoring and analytical techniques will have a confidence limit of 95% of not less than plus or minus 25% for airborne concentrations of lead greater than or equal to 30 µg/m^3.

Air samples will be submitted under Chain-of-Custody protocol to an American Industrial Hygiene Association (AIHA) accredited analytical laboratory for analysis. Sample results will be available five days after submittal and will be provided to monitored employees. If results indicate exposure at or above the action level, additional monitoring at least seven days apart will be performed until at least two consecutive measurements are below the action level (30 µg/m^3). Calibration of air sampling pumps certificates will be obtained from the supplier and be on site for inspection. Trip and field blanks will be submitted per frequency established by a certified industrial hygienist.

10.2 Organic Vapors

If site conditions indicate the possibility of elevated organic compound levels, air monitoring will be performed to determine whether personnel were exposed to airborne concentrations above the PELs listed in Table 1. Since identifying specific compounds will be difficult using current organic vapor or photo-ionization detector (PID) technology the cumulative reading will require action if the gasoline PEL is exceeded. The exception is where a specific known chemical or group of chemicals has been identified, then specific analyzers will be used. All air monitoring equipment will show calibration data within manufacturer specifications and the manufacturer's instruction manual will be on site. Be sure to know and understand the response factor of the calibration gas to your particular instrument for the chemicals listed in Table 1 so that you can establish when you are approaching an exposure limit.

10.3 Possible Explosive Atmospheres

Gasoline has a flammable range from approximately 1.4 to 7.6 percent by volume in air. One percent in air is equivalent to 10,000 ppmv; thus, the LEL is 14,000 ppmv. Normally explosive levels may be reached in tanks, pits, or other confined spaces. Any area suspected of containing potentially explosive levels of gasoline will be evaluated with an intrinsically safe or explosion-proof combustible gas indicator (CGI). All air monitoring equipment will show data of last calibration within manufacturer specifications and the manufacturer's instruction manual will be on site.

Personnel response will be based on the following action levels from CGI readings. Please note that the crucial number is 10% of the LEL. When using a PID, 1,400 ppmv corresponds to 10% of the LEL.

- If less than 10% of LEL, then continue activities and monitoring (<1,400 ppmv on the PID meter).

- If 10 to 25% of LEL, then continue monitoring with extreme caution as higher levels are encountered. Begin to initiate engineering controls (rinsing, degassing, dry ice) to reduce the level before doing any other work (1,400 to 3,500 ppmv).
- If greater than 25% of LEL, then there is an explosion hazard[1]. Cease activities and vacate area immediately (>3,500 ppmv).

Note: CGI readings are provided in percent of LEL; organic vapor meters (OVMs) or PIDs provide results in ppmv.

1. The one exception to working in environments greater than 25% LEL is during UST removal, specifically after the tank has the fuel removed and prior to triple rinsing the tank cavity. During this period LEL levels commonly exceed 25%, management of this hazard will be detailed in your subcontractor's JSA and SOP.

If an explosion potential is present on site beyond 25% of the LEL, ERI's personnel and subcontractors must immediately withdraw from the site. The hazard potential will be evaluated by ERI's management, and a plan of action will be assessed.

11.0 DECONTAMINATION PROCEDURES

If warranted, work equipment and PPE will undergo gross decontamination on site. This gross decontamination will include washing contaminated equipment with a trisodium phosphate (TSP), Liqui-Nox® solution or Simple Green®.

Grossly contaminated or used PPE (Tyvek™, gloves, and P-100 filters) will be disposed of in Department of Transportation (DOT) certified 55-gallon drums that are labeled identifying the contaminant.

At the completion of the project work, the drum will be sealed and disposed of per state or federal regulations. Respirators will be washed and decontaminated per manufacturer's specifications.

12.0 SPILL CONTAINMENT

All hazardous substances and contaminated soils, liquids, and other residues are to be contained, stored, and labeled in accordance with federal, state, and local regulations. When drumming wastes ensure the following practices are implemented:

- Ensure waste material is compatible with the container (i.e., do not put highly acidic or alkaline wastes in steel drums).
- Drums shall be inspected before waste is put inside. Ensure drums are not rusted or damaged.
- Ensure proper labeling is applied that identifies the type of waste, date, and contact information on to drum before placing waste.
- Only leave drums open when adding or removing the contents, otherwise drums are to be closed, which means the bung or drum ring is on and securely snug.
- Preferred spacing of drums for on-site storage shall be 36 inches whenever possible. Drums need to be visibility inspected and readily accessible for emergency response.

Spill containment materials shall be on site during management of drums in the event of failure or leak.

Locations of drums and bins should minimize the possibility of contents leaving the site in the event of a failure of the containment.

For containers containing flammable materials, fire extinguishing equipment shall be present and ready for use to control incipient fires.

Drums shall not be used to work from or stand upon.

13.0 EMERGENCY RESPONSE PROCEDURES

In the event of a fire, explosion, or property damage, ERI will be immediately notified. If necessary, local fire or response agencies will be called. Where possible, a land line telephone such as a pay phone or the station

phone shall be used when calling the local fire or response agency. Once notifications to the local fire or response agency are made (if necessary), contact your branch project manager, if he or she is unavailable; talk with another PM, branch manager or officer of the company. Provide details of the event to management at which point they notify the client of the incident.

In the event of a small contained fire, 9-1-1 will be contacted and properly trained ERI personnel may attempt to extinguish the fire provided personnel are not in danger of being trapped and will use the 20 pound fire extinguishers on hand. If the fire can not be extinguished, the above procedures should be followed

In the event of an accident resulting in physical injury, first aid will be administered, and the injured worker will be transported to the nearest hospital or emergency medical clinic for emergency treatment. A physician's attention is required regardless of the severity of the injury. Subcontractors may already have arrangements with a different occupational medical clinic or urgent care facility. ERI shall allow an injured subcontractor employee to be taken to a location authorized by their company and allow the subcontractor company to implement their case management policies and procedures. IF you think the injured person require treatment beyond first aid call 9-1-1 and make a request for an ambulance.

13.1 Spills or Releases

Spills or releases can occur in the event a below ground utility is damaged during work. Before beginning work identify the following disconnects at a site: electrical, water, gasoline emergency shut-off, and natural gas. Be prepared to disconnect that utility in the event it is damaged during the performance of our work. In the event of a release from a remediation system, drum, or tank such as a temporary storage tank (i.e., baker tank), employees are to conduct the following evaluation:

- Am I in imminent danger from explosion, fire, or contamination? If so leave the area immediately.
- Contact your local office and inform them of the nature and extent of the release.
- If additional help is required, call the contingency numbers listed in this section.
- If safe to do so, turn off or close off the source of the leak.
- Dike any openings to storm drains and try to contain spilled materials.
- Based on resources available, begin cleanup of material, place into new tanks or drums, label, and leave drums and tanks secured and closed.

13.2 Overt Personnel Exposure

If overt personnel exposure occurs during the project, typical responses should include the following:

- Skin or eye contact: Wash and rinse affected area thoroughly with copious amounts of soap and water, and then provide appropriate medical attention. Eyes and skin should be rinsed for a minimum of 15 minutes upon chemical contamination.
- Puncture wound: Decontaminate and transport to emergency hospital.

13.3 Emergency Telephone Numbers:

Fire and Police 911

Local Police Number…… **(562) 464-3333 Ext. 8826**

Local Fire Department Number……..... **(562) 944-9713**

Primary location for employees who require first aid/medical treatment which is not life threatening are to use the listed occupational medical clinic during hours of operation. When work is occurring outside operational days and times of the listed occupational clinic, employees are directed to seek medical professional assistance at the hospital's emergency services location as the 24-hour alternative listed below.

Occupational Medical Clinic ..... …….. **(818) 882-8100**

US Healthworks Medical Group Chatsworth
9700 De Soto Avenue
Chatsworth, CA 91311
Operating Hours:
Open: 24 hours a day, 7 days a week for occupational injuries

Exit site on Norwalk Boulevard, turn right (south) and proceed for 0.2 miles. Turn right (west) onto Florence Avenue and continue for 1 mile. Turn right (northwest) onto I-5 North and continue for 32.5 miles. Merge onto CA-118 West and continue for 8.9 miles. Take the De Soto Avenue Exit. Turn left (south) onto De Soto Avenue and continue for 2.0 miles. The occupational medical clinic will be on the left-hand side (see attached map).

Hospital ..... **(562) 698-0811 Ext. 7511**

Presbyterian Intercommunity Hospital
12401 Washington Boulevard
Whittier, CA 90602

Exit site on Norwalk Boulevard, turn right (south) and proceed for 0.2 miles. Turn left (east) onto Florence Avenue and continue for 0.5 miles. Turn left (north) onto Bloomfield Avenue and continue for 0.4 miles. Bloomfield Avenue becomes Santa Fe Springs Road and curves east, continue for 1.9 miles. Turn left (northwest) onto Lambert Road and continue for 0.3 miles. The hospital will be straight ahead. Follow the posted signs to the EMERGENCY entrance (see attached map).

Local Public Utility Service Providers:

Gas Number…….... **(800) 427-2200**
Southern California Gas
Electric Utility Number..…….... **(800) 655-4555**
Southern California Edison
Sewer/Water Number……..... **(562) 868-0511**
Santa Fe Springs Water Services
Cable/TV Number……..... **(888) 892-2253**
Time Warner Cable
Telecommunications Number……..... **(800) 483-1000**
Verizon

Additional Contingency Telephone Numbers

ENVIRONMENTAL RESOLUTIONS, INC, Ventura, State ..... (805) 644-4157

ENVIRONMENTAL RESOLUTIONS, INC, Lake Forest, California ..... (949) 457-8950

EXXONMOBIL ENVIRONMENTAL SERVICES (Mahesh Vidyasagar) ..... (281) 654-8458

Local or State Department of Occupational Safety & Health Administration (559) 454-1295

Chemical Transportation Emergency Center (CHEMTREC) ..... (800) 424-9300

Note: CHEMTREC is a public service of the American Chemistry Council (formerly known as the Chemical Manufacturers Association). CHEMTREC can usually provide hazard information, warnings, and guidance when given the identification number or the name of the product and the nature of the problem. CHEMTREC can also get personnel in contact with the appropriate experts.

Site # Jalk Fee ERI # (081155)
10607 Norwalk Boulevard
Santa Fe Springs, California

We, the undersigned, agree that all activities conducted during and for completion of this project will be performed in accordance with the site-specific health and safety plan and with the following common safety objectives:

1) The first and foremost priority during this project is to maintain a safe and healthy work environment.
2) No work will be performed until every necessary safety precaution has been taken.
3) No project objectives will knowingly be allowed to put at risk human health and the environment.

We, the undersigned, have also confirmed that site-specific health and safety plan and the appropriate Material Safety Data Sheets have been provided, reviewed, and understood.

If at any time during the performance of activities on this project, there is an unsafe condition, then we will immediately take action to alleviate the unsafe condition. If we are unable to cause the cessation of the unsafe condition, then we will immediately contact the ExxonMobil Staff Engineer/Geologist listed below.

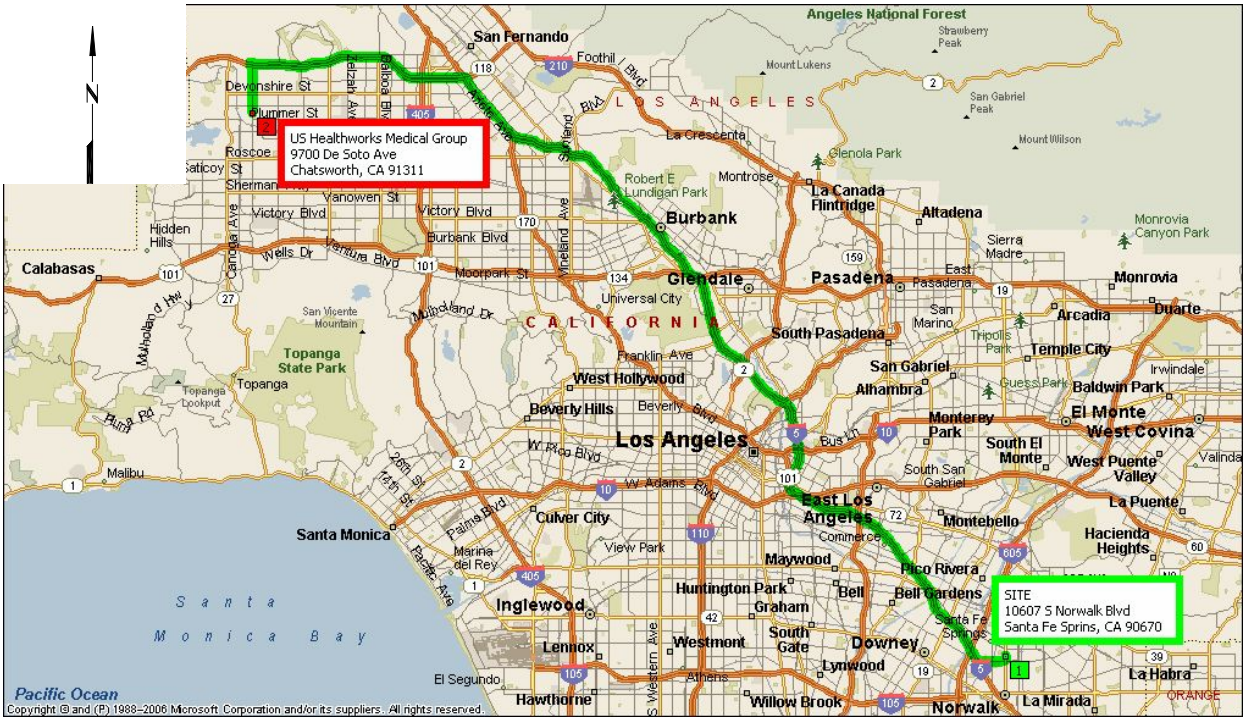
ExxonMobil Environmental Staff Engineer/Geologist: Project Manager – Mahesh Vidyasagar
Office Phone: (281) 654-8458
Mobile Phone: _____
Home Phone: _____

The undersigned have read and understood the Health and Safety Plan and agree to abide by its contents		
Printed Name	**Signature**	**Date**

FIGURES

OCCUPATIONAL MEDICAL CLINIC

US Healthworks Medical Group
9700 De Soto Avenue
Chatsworth, CA 91311
(818) 882-8100

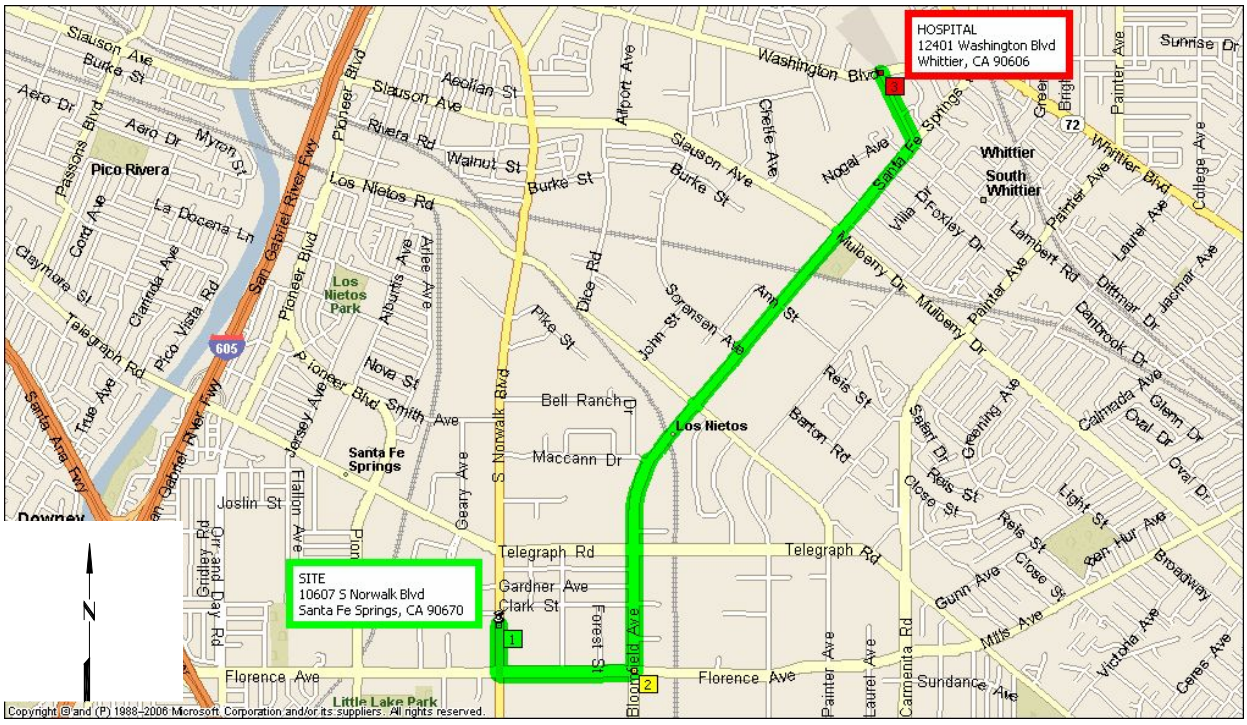


Directions:

- Exit site on Norwalk Boulevard, turn right (south) and proceed for 0.2 miles.
- Turn right (west) onto Florence Avenue and continue for 1 mile.
- Turn right (northwest) onto I-5 North and continue for 32.5 miles.
- Merge onto CA-118 West and continue for 8.9 miles.
- Take the De Soto Avenue Exit.
- Turn left (south) onto De Soto Avenue and continue for 2.0 miles.
- The occupational medical clinic will on the left-hand side (see attached map).

HOSPITAL MAP

Presbyterian Intercommunity Hospital
12401 Washington Boulevard
Whittier, California 90602
(562) 698-0811 Ext. 7511



Directions:

- Exit site on Norwalk Boulevard, turn right (south) and proceed for 0.2 miles.
- Turn left (east) onto Florence Avenue and continue for 0.5 miles.
- Turn left (north) onto Bloomfield Avenue and continue for 0.4 miles.
- Bloomfield Avenue becomes Santa Fe Springs Road and curves east, continue for 1.9 miles.
- Turn left (northwest) onto Lambert Road and continue for 0.3 miles.
- The hospital will be straight ahead.
- Follow the posted signs to the emergency entrance (see attached map).

APPENDICES

APPENDIX A

HEAT STRESS

HEAT STRESS PROTOCOL

If the ambient air temperature is above 80 degrees F, the need for heat stress and heat exhaustion monitoring will be evaluated. Heat stress and heat exhaustion monitoring will be required if the temperatures exceed 90 degrees F. Heat stroke is a life-threatening situation in which the victim's temperature control system, which produces sweating to cool the body, stops working. Body temperature can rise quickly to elevations causing brain damage and death. Heat exhaustion is less dangerous and results from the loss of body fluids. This fluid loss causes blood flow to decrease in vital organs resulting in a form of shock. High humidity (>70% relative humidity) may retard evaporation resulting in inadequate cooling of the body. Heat cramps are muscular spasms due to heavy exertion. These cramps usually involve the abdominal and leg muscles and are due to the loss of water and salt from heavy sweating.

	Signs/Symptoms	First Aid
Heat Fatigue	• Early warning sign of heat stress • Too tired and weak to concentrate on doing job	• Move to cool place • Drink water every 15 minutes
Heat Cramps	• Develops when a person sweats out more salt than the body takes in and the muscles cramp	• Move to cool place • Drink water every 15 minutes • Gatorade can help replace necessary salt
Heat Exhaustion	• Cool, pale, moist skin • Heavy sweating • Normal body temperature • Dilated (large) pupils • Headache and nausea • Dizziness and vomiting	• Move to cool area • Have victim lie down • Slightly elevate feet • Loosen clothing • Apply wet towels • Give a glass of water every 15 minutes
Heat Stroke	• Hot, red skin • Constricted pupils • High body temperature • Little or no perspiration • Chills, confusion and strong rapid pulse	• Call EMS (911) • Check ABCs (airway, breathing, circulation) • Immerse in cool water or • Wrap in wet towels • Give nothing by mouth

Be sure there is adequate shade at or near the site for employees to rest. Have two gallons of water (or electrolyte solution/Gatorade) per employee at the site. Encourage employees to drink plenty of fluids and implement the following break schedule:

- Work for 1 to 1.5 hours.
- Break for 15 minutes.
- Count the radial pulse of all personnel for 30 seconds (and multiply by 2 to get beats per minute) at the beginning of the break period.
- If the heart rate exceeds 110 beats per minute (BPM), shorten the next work cycle by 1/3 and keep the rest periods at 15 minutes.
- If the heart rate exceeds 110 BPM at the next rest period, shorten the next work cycle by 1/3 again, keeping the 15 minute breaks.
- If the heart rate ever exceeds 120 BPM, the employee will be required to rest for 30-45 minutes to allow the heart rate to decrease.

The Site Safety Officer (Project Manager, Staff Geologist/Staff Engineer or senior ERI employee) will institute these procedures and monitor employees for signs of heat stress. Preventing heat stress is particularly important because once someone suffers from heat stroke or heat exhaustion, that person may be predisposed to additional heat injuries.

APPENDIX B

COLD STRESS

COLD STRESS PROTOCOL

If the ambient air temperature is below 50 degrees Fahrenheit (F) in wet conditions, or if the field employee feels cold, the need for cold stress monitoring will be evaluated. Cold stress, hypothermia, and frost bite monitoring will be required if the temperatures fall below 50 degrees F in wet conditions. Cold stress is a life-threatening situation in which the victim's temperature control system, which regulates blood flow and inner core body temperature, makes adjustments to protect vital organs when exposed to prolonged cold and/or wet conditions. Body temperature can fall quickly to elevations causing hypothermia, frost bite, and death.

Layered Clothing System

Select the proper type and amount of clothing. Regulate your clothing according to your activity rate. This is the most effective way to ensure comfort. Pay attention to your bodies' signals. Do not wait until you are cold to put on more clothing. Act when you first begin to feel cooler.

Clothing layers:

- Long, thermal underwear
- Sweater, light jacket
- Long, thermal underwear
- Wind or rain pants
- Insulating socks wool or wool blend
- Footwear, steel-toe boots waterproofed
- Gloves and mittens
- Polypropylene shirt or inner layer
- Wind or rain gear
- Polypropylene, wool, or wool blend inner pants
- Wicking inner socks polypropylene
- Boot liners insulated insoles
- Head coverings

Types of Cold

Wet cold: 50º F to 14º F

This is the most dangerous range. Wide temperature variations from melting during the day to freezing at night makes proper dressing difficult and important. Damp conditions from melting snow or rain makes keeping dry difficult.

Dry cold: 14º F to -20º F

The ground is frozen and snow is dry and crystallized. Strong winds cause the most concern with keeping warm. Extra clothing layers and wind-proof outer garments should be added.

Arctic cold: below -20º F

This range requires the most insulation and wind-proofing. Many materials change physical properties, becoming brittle. Do not work in these conditions.

Loss of Body Heat

Homeostasis

This is the body's process for maintaining an even temperature. The arms and legs are used as a radiator to remove excess heat from the body. This process dilates the blood vessels, allowing more blood to flow to the skin surfaces. When the body temperature drops, these blood vessels constrict, decreasing blood flow, and thereby, heat loss. This is why hands and feet get numb when cold, and why they are particularly vulnerable to frostbite. Since your brain needs oxygen to function, your body can't cut off the flow of blood to your head in order to conserve heat. Consequently, much of your body heat can be lost through an uncovered head and neck.

Radiation is the reason for up to 55% reduction of heat loss. Heat is lost directly from exposed skin and the head. The head may lose up to one-half of the body's total heat production at 40 degrees F, and up to three quarters at 5 degrees F.

Evaporation is the reason for up to 21% reduction of heat loss. This loss is caused by evaporation of sweat and moisture from the skin. Lung exhalation also produces substantial heat loss. There is little that can be done about this. We need to allow for this by using breathable fabrics to allow this moisture to pass out freely.

Conduction (along with convection) is the reason for up to 15% reduction of heat loss. This is caused by skin contact with cold objects, primarily the hands, and wet or tight clothing. Handling gasoline and other super-cooled liquids at low temperatures is especially dangerous.

Convection is the heat loss caused by the wind carrying away heat from the surface of the skin. This includes wind-chill effects.

Respiration causes 2-9% of heat loss. This is caused from inhaling cold air and exhaling warm air.

Cold Weather First Aid

Dehydration

Excessive loss of body water impairs the ability to reason, so the victim may not react properly.

Prevention

- Drink at least 2 quarts of water a day.
- Increase fluid intake at first signs of darker yellow urine.
- Avoid dehydrating foods (high protein) and fluids (e.g., coffee, caffeine).

Symptoms

1 to 5 % deficiency

- Increased pulse rate
- Dark urine or constipation
- Thirst
- Nausea and loss of appetite
- Irritability and fatigue

6 to 10 % deficiency

- Headache, dizziness
- Tingling
- Inability to walk
- Labored breathing
- Absence of salivation
- Cyanosis (bluish or grayish skin color)

11 to 20 % deficiency

- Swollen tongue, inability to swallow
- Shriveled, numb skin
- Delirium, unconsciousness, and death
- Blurred vision and deafness
- Painful urination

Treatment

Mild cases - drink liquids, keep warm.

More severe cases require professional medical treatment.

Hypothermia

This is the lowering of the inner core temperature of the body. This can and usually does happen above freezing. The victim may not recognize the symptoms and may not be able to think clearly enough to react. Injury or death may result.

Predisposing Conditions

- Poor physical condition
- Thin build
- Getting wet
- Exhaustion
- Inadequate nutrition and water intake
- Non-protective clothing
- Inadequate protection from wind, rain and snow

Symptoms

- Loss of ability to reason
- Slowing, drowsiness, and fatigue
- Thickness of speech
- Irrationality and poor judgment
- Cyanosis (blueness of skin)
- Stupor
- Shivering
- Stumbling
- Amnesia
- Hallucinations
- Dilation of pupils of eyes
- Decreased heart/respiration rate

Treatment

- Shelter the victim from wind and weather.
- Change wet clothing.
- Increase exercise, if possible.
- Give hot drinks.
- Apply external heat.
- Insulate the victim from the ground.
- Put on windproof, waterproof gear.
- Wrap in blanket.
- Follow with candy or other high-sugar foods.
- Huddle for body heat from others.
- Place victim in a tub of 105 degrees F water, never above 110 degrees F.

Prevention

- Keep rested, maintain good nutrition.
- Use proper clothing.
- Get plenty of exercise. Do not sit around much.
- Take immediate corrective action for any signs.
- Consume plenty of high-energy food.
- Discontinue working if tired.
- Watch each other for signs.

Frostbite

This is tissue injury involving the actual freezing of the skin and underlying tissues. Recovery is slow; severe frostbite can lead to gangrene. Once exposed, the victim will be predisposed to frostbite in the future.

Predisposing Conditions

- Prolonged exposure to temperatures 32 degrees F or below.
- Brief exposure at extremely low temperatures (-25 degrees F and below)
- Exposed body parts
- Restriction of circulation.
- Fatigue, poor nutrition, low liquid intake, and poor physical condition.
- Previous case of frostbite or other cold injury

Symptoms

First Degree (Frostnip)

- Redness, pain, burning, stinging, or prickly sensation
- Pain disappears and there is a sudden blanching of the skin
- The skin may look mottled
- Skin is firm to the touch, but resilient underneath
- On thawing, there is aching pain or brownness. Skin may peel off, and the part may remain cold for some time.

Second Degree (Superficial Frostbite, Frostbite)

- No pain, the part may feel dead
- Numbness, hard to move the part
- Tissue and layers underneath are hard to the touch
- After thawing (takes 3 to 20 days) pain, large blisters, and sweating
- Black or discolored skin sloughs off, leaving tender new skin

Third degree (Severe Frostbite)

- Full thickness of the skin is involved
- After thawing, pain continues for 2 to 5 weeks

Fourth degree (Severe Frostbite)

- Skin and bone are frozen
- Swelling and sweating occur
- Gangrene may develop, amputation may be necessary

Treatment

- Do not rub affected area with snow. Hold it over fire or use cold water to thaw it.
- Exercise the affected area to promote blood circulation.
- Use any warmth available to thaw area.
- Do not attempt to thaw frostbitten limbs in the field. It is less harmful for the victim to walk out on a frostbitten limb than to thaw it in the field. Thawing only risks additional injury and the victim will be in too much pain to walk.
- Check for hypothermia.
- For more severe cases, refer to more complete instructions.

Prevention

- Proper clothing
- Good nutrition, drink water, maintain core temperature
- Use buddy system to check face, nose, and ears
- Immediate treatment of minor symptoms
- Do not work in cold conditions, if it can be avoided

APPENDIX C

MATERIAL SAFETY DATA SHEETS

ExxonMobil

123455-20 GASOLINE, UNLEADED AUTOMOTIVE
MATERIAL SAFETY DATA BULLETIN

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1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: GASOLINE, UNLEADED AUTOMOTIVE
SUPPLIER: EXXONMOBIL OIL CORPORATION
3225 GALLOWS RD.
FAIRFAX, VA 22037

24 - Hour Health and Safety Emergency (call collect): 609-737-4411

24 - Hour Transportation Emergency:
CHEMTREC: 800-424-9300 202-483-7616
LUBES AND FUELS: 281-834-3296

Product and Technical Information:
Lubricants and Specialties: 800-662-4525 800-443-9966
Fuels Products: 800-947-9147
MSDS Fax on Demand: 713-613-3661
MSDS Internet Website: http://www.exxon.com, http://www.mobil.com

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2. COMPOSITION/INFORMATION ON INGREDIENTS

CHEMICAL NAMES AND SYNONYMS: GASOLINE AND PROPRIETARY ADDITIVES

GLOBALLY REPORTABLE MSDS INGREDIENTS:

Substance Name	Approx. Wt%
GASOLINE	100

COMPONENT(S) OF PRODUCT INGREDIENTS INCLUDE:

METHYL-TERT-BUTYL ETHER (1634-04-4)	< 16
ETHANOL (64-17-5)	< 11
XYLENE (1330-20-7)	10
TRIMETHYL BENZENE (25551-13-7)	8
TOLUENE (108-88-3)	6

ETHYL BENZENE (100-41-4)	3
N-HEXANE (110-54-3)	3
BENZENE (71-43-2)	2
NAPHTHALENE (91-20-3)	0.5

NOTE: The concentration of the components shown above may vary substantially. In certain countries benzene content may be limited to lower levels (eg. US reformulated gasoline). Oxygenates such as tertiary-amyl-methyl ether, ethanol, di-isopropyl ether, and ethyl-tertiary-butyl ether may be present (eg. concentration to provide a minimum oxygen content of 1.5 Wt% in the US). Because of volatility considerations, gasoline vapor may have concentrations of components very different from those of liquid gasoline. The major components of gasoline vapor are: butane, isobutane, pentane and isopentane. The reportable component percentages, shown in the Regulatory Information section, are based on API's evaluation of a typical gasoline mixture.

See Section 8 for exposure limits (if applicable).

3. HAZARDS IDENTIFICATION

This product is considered hazardous according to regulatory guidelines (See Section 15).

EMERGENCY OVERVIEW: Clear (May Be Dyed) Liquid. EXTREMELY FLAMMABLE, HIGH HAZARD. Liquid can release considerable vapor at temperatures below ambient which readily form flammable mixtures. Vapors settle to ground level and may reach, via drains and other underground passages, ignition sources remote from the point of escape. Product can accumulate a static charge which may cause a fire or explosion. DOT ERG No. : 128

POTENTIAL HEALTH EFFECTS: Skin irritation. May cause eye and respiratory irritation, headache, dizziness, nausea, loss of consciousness, and in cases of extreme exposure, possibly death. Low viscosity material-if swallowed may enter the lungs and cause lung damage. Overexposure to benzene may result in cancer, blood disorders and damage to the bone marrow. Long-term exposure to gasoline vapor has caused kidney and liver cancer in laboratory animals. Case reports of chronic gasoline abuse (such as sniffing) and chronic misuse as a solvent or as a cleaning agent have shown a range of nervous system effects, sudden deaths from heart attacks, blood effects and leukemia. These effects are not expected to occur at exposure levels encountered in the distribution and use of gasoline as a motor fuel.

POTENTIAL ENVIRONMENTAL EFFECTS: Toxic to aquatic organisms; may cause long-term adverse effects in the aquatic environment.

For further health effects/toxicological data, see Section 11.

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4. FIRST AID MEASURES

EYE CONTACT: Flush thoroughly with water. If irritation occurs, call a physician.

SKIN CONTACT: Wash contact areas with soap and water. Immediately remove contaminated clothing, including shoes. (See Section 16 - Injection Injury)

INHALATION: Remove from further exposure. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with mechanical device or use mouth-to-mouth resuscitation.

INGESTION: Seek immediate medical attention. Do not induce vomiting.

NOTE TO PHYSICIANS: Material if ingested may be aspirated into the lungs and can cause chemical pneumonitis. PRE-EXISTING MEDICAL CONDITIONS WHICH MAY BE AGGRAVATED BY EXPOSURE: Skin contact may aggravate an existing dermatitis. Benzene- Individuals with liver disease may be more susceptible to toxic effects. Hexane- Individuals with neurological disease should avoid exposure.

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5. FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA: Carbon Dioxide, Foam, Dry Chemical, Water Fog.

SPECIAL FIRE FIGHTING PROCEDURES: Evacuate area. For large spills, fire fighting foam is the preferred agent and should be applied in sufficient quantities to blanket the product surface. Water may be ineffective, but water should be used to keep fire-exposed containers cool. Water spray may be used to flush spill away from exposures, but good judgement should be practiced to prevent spreading of the product into sewers, streams or drinking water supplies. If a leak or spill has not ignited, apply a foam blanket to suppress the release of vapors. If foam is not available, a water spray curtain can be used to disperse vapors and to protect personnel attempting to stop the leak.

SPECIAL PROTECTIVE EQUIPMENT: For fires in enclosed areas, fire fighters must use self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS: EXTREMELY FLAMMABLE, HIGH HAZARD. Liquid can release considerable vapor at temperatures below ambient which readily form flammable mixtures. Vapors settle to ground level and may reach, via drains and other underground passages, ignition sources remote from the point of escape. Product can accumulate a static charge which may cause a fire or explosion.

COMBUSTION PRODUCTS: Fumes, smoke, carbon monoxide, sulfur oxides, aldehydes and other decomposition products, in the case of incomplete combustion.

Flash Point C(F): < -40(-40) (ASTM D-56).

Flammable Limits (approx.% vol.in air) - LEL: 1.4%, UEL: 7.6%

NFPA HAZARD ID: Health: 1, Flammability: 3, Reactivity: 0

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6. ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES: Report spills/releases as required to

appropriate authorities. U.S. Coast Guard and EPA regulations require immediate reporting of spills/releases that could reach any waterway including intermittent dry creeks. Report spill/release to Coast Guard National Response Center toll free number (800)424-8802. In case of accident or road spill notify CHEMTREC (800) 424-9300.

PROCEDURES IF MATERIAL IS RELEASED OR SPILLED:
LAND SPILL: Eliminate sources of ignition. Warn occupants in downwind areas of fire and explosion hazard. Shut off source taking normal safety precautions. Take measures to minimize the effects on ground water. Recover by pumping using explosion-proof equipment or contain spilled liquid with sand or other suitable absorbent and remove mechanically into containers. If necessary, dispose of adsorbed residues as directed in Section 13.
WATER SPILL: Eliminate sources of ignition. Advise occupants and ships in the vicinity in downwind areas of fire and explosion hazard and warn them to stay clear. Notify port and other relevant authorities. Do not confine in area of leakage. Allow liquid to evaporate from the surface. Do not use dispersants.

ENVIRONMENTAL PRECAUTIONS: Prevent material from entering sewers, water sources or low lying areas; advise the relevant authorities if it has, or if it contaminates soil/vegetation.

PERSONAL PRECAUTIONS: See Section 8

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7. HANDLING AND STORAGE

HANDLING: USE NON-SPARKING TOOLS AND EXPLOSION-PROOF EQUIPMENT. NEVER SIPHON GASOLINE BY MOUTH. GASOLINE SHOULD NOT BE USED AS A SOLVENT OR AS A CLEANING AGENT. Avoid contact with skin. Avoid inhalation of vapors or mists. Use in well ventilated area away from all ignition sources. This liquid is volatile and gives off invisible vapors. Either the liquid or vapor may settle in low areas or travel some distance along the ground or surface to ignition sources where they may ignite or explode. Use product with caution around heat, sparks, pilot lights, static electricity, and open flames. It is unlawful and dangerous to put gasoline into unapproved containers. Do not fill container in or on a vehicle. Static electricity may ignite vapors and cause fire. Place container on ground when filling and keep nozzle in contact with container. See Section 8 for additional personal protection advice when handling this product.

STORAGE: Drums must be grounded and bonded and equipped with self-closing valves, pressure vacuum bungs and flame arresters. Store away from all ignition sources in a cool, well ventilated area equipped with an automatic sprinkling system. Outside or detached storage preferred. Storage containers should be grounded and bonded.

SPECIAL PRECAUTIONS: To prevent and minimize fire or explosion risk from static accumulation and discharge, effectively bond and/or ground product transfer system. Do not use electronic devices (including but not limited to cellular phones, computers, calculators, pagers, etc.) in or around any fueling operation or storage area unless the devices are certified intrinsically safe by an approved national testing agency and to the safety standards required by national and/or local laws and regulations. Electrical equipment and fittings must comply with local fire

prevention regulations for this class of product. Use the correct grounding procedures. Refer to national or local regulations covering safety at petroleum handling and storage areas for this product.

EMPTY CONTAINER WARNING: Empty containers retain residue (liquid and/or vapor) and can be dangerous. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH. Do not attempt to refill or clean container since residue is difficult to remove. Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS:

ExxonMobil recommends an 8-hour time-weighted average (TWA) exposure of 300 mg/m3 (100 ppm vapor).

		---TWA---		----STEL---		NOTE
Substance Name (CAS-No.)	Source	ppm	mg/m3	ppm	mg/m3	
GASOLINE						
	OSHA	300	900	500	1500	
	ACGIH	300	890	500	1480	
METHYL-TERT-BUTYL ETHER (1634-04-4)						
	ACGIH	40	144			
	XOM	25		75		
ETHANOL (64-17-5)						
	OSHA	1000	1900			
	ACGIH	1000	1880			
XYLENE (1330-20-7)						
O, M, P, -Isomers	OSHA	100	435	150	655	
O, M, P, -Isomers	ACGIH	100	434	150	651	
TRIMETHYL BENZENE (25551-13-7)						
	OSHA	25	125			
	ACGIH	25	123			
TOLUENE (108-88-3)						
	OSHA	100	375	150	560	
Skin	ACGIH	50	188			
	XOM		200			
ETHYL BENZENE (100-41-4)						

	OSHA	100	435	125	545
	ACGIH	100	434	125	543
N-HEXANE (110-54-3)					
	OSHA	50	180		
Other Isomers	OSHA	500	1800	1000	3600
N-Hexane Skin	ACGIH	50	176		
Other Isomers	ACGIH	500	1760	1000	3500
BENZENE (71-43-2)					
	OSHA	1		5	
Skin	ACGIH	0.5	1.6	2.5	8
NAPHTHALENE (91-20-3)					
	OSHA	10	50	15	75
	ACGIH	10	52	15	79

NOTE: Limits shown for guidance only. Follow applicable regulations.

VENTILATION: Ventilation equipment must be explosion proof.
RESPIRATORY PROTECTION: Approved respiratory equipment must be used when airborne concentrations are unknown or exceed the recommended exposure limit. Self-contained breathing apparatus may be required for use in confined or enclosed spaces.
EYE PROTECTION: If splash with liquid is possible, chemical type goggles should be worn.
SKIN PROTECTION: Impervious gloves should be worn. Good personal hygiene practices should always be followed.

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9. PHYSICAL AND CHEMICAL PROPERTIES

Typical physical properties are given below. Consult Product Data Sheet for specific details.

APPEARANCE: Liquid
COLOR: Clear (May Be Dyed)
ODOR: Gasoline
ODOR THRESHOLD-ppm: NE
pH: NA
BOILING POINT C(F): > 20(68)
MELTING POINT C(F): NA
FLASH POINT C(F): < -40(-40) (ASTM D-56)
FLAMMABILITY (solids): NE
AUTO FLAMMABILITY C(F): NE
EXPLOSIVE PROPERTIES: NA
OXIDIZING PROPERTIES: NA
VAPOR PRESSURE-mmHg 20 C: > 200.0
VAPOR DENSITY: 3.0
EVAPORATION RATE: NE
RELATIVE DENSITY, 15/4 C: 0.79
SOLUBILITY IN WATER: Negligible
PARTITION COEFFICIENT: > 1
VISCOSITY AT 40 C, cSt: < 1.0
VISCOSITY AT 100 C, cSt: NA
POUR POINT C(F): NA

FREEZING POINT C(F): NE
VOLATILE ORGANIC COMPOUND: NE
DMSO EXTRACT, IP-346 (WT.%): NA
NA=NOT APPLICABLE NE=NOT ESTABLISHED D=DECOMPOSES

FOR FURTHER TECHNICAL INFORMATION, CONTACT YOUR MARKETING REPRESENTATIVE

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10. STABILITY AND REACTIVITY

STABILITY (THERMAL, LIGHT, ETC.): Stable.
CONDITIONS TO AVOID: Heat, sparks, flame and build up of static electricity.
INCOMPATIBILITY (MATERIALS TO AVOID): Halogens, strong acids, alkalies, and oxidizers.
HAZARDOUS DECOMPOSITION PRODUCTS: Product does not decompose at ambient temperatures.
HAZARDOUS POLYMERIZATION: Will not occur.

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11. TOXICOLOGICAL DATA

---ACUTE TOXICOLOGY---

ORAL TOXICITY (RATS): Practically non-toxic (LD50: greater than 2000 mg/kg). ---Based on testing of similar products and/or the components.
DERMAL TOXICITY (RABBITS): Practically non-toxic (LD50: greater than 2000 mg/kg). ---Based on testing of similar products and/or the components.
INHALATION TOXICITY (RATS): Practically non-toxic (LC50: greater than 5 mg/l). ---Based on testing of similar products and/or the components.
EYE IRRITATION (RABBITS): Practically non-irritating. (Draize score: greater than 6 but 15 or less). ---Based on testing of similar products and/or the components.
SKIN IRRITATION (RABBITS): Irritant. (Primary Irritation Index: 3 or greater but less than 5). ---Based on testing of similar products and/or the components.
OTHER ACUTE TOXICITY DATA: Inhalation of high concentrations of vapors or aerosols/mists, especially deliberate or abuse exposure, may cause respiratory system irritation and damage. These exposures may also result in central nervous system depression and damage, possibly leading to death. Prolonged skin contact with gasoline may cause severe skin irritation similar to a chemical burn. The above effects, which may result from the whole gasoline or some of the gasoline components, are well documented in the medical literature. HAZARDS OF COMBUSTION PRODUCTS: Exposure to high concentrations of carbon monoxide can cause loss of consciousness, heart damage, brain damage and death.

---SUBCHRONIC TOXICOLOGY (SUMMARY)---

Two dermal studies resulted in significant irritation in rabbits but no significant systemic toxicity. 90-day inhalation exposures (approximately 1500 ppm vapor) in rats and monkeys produced light hydrocarbon nephropathy in male rats, but no other significant systemic toxicity.

---NEUROTOXICOLOGY (SUMMARY)---

Exposure to high concentrations of unleaded gasoline in rodents caused reversible central nervous system depression, however, no persistent neurotoxic effects were observed in subchronic inhalation studies of gasoline blending streams. No neurotoxic effects, as measured by a functional observation battery, motor activity, and neuropathology, were observed in rats exposed to light alkylate naphtha for 13 weeks at concentrations up to 6600 ppm. The medical literature clearly documents neurotoxic effects in humans from abusive gasoline inhalation (sniffing).

---REPRODUCTIVE TOXICOLOGY (SUMMARY)---

Two separate inhalation teratology studies of unleaded gasoline vapor at exposures up to 1600 ppm and 9000 ppm for 6 hours/day on days 6-20 did not result in any significant developmental effects in rats. No significant effects were observed in the mothers or offspring. A two-generation inhalation reproductive study (CONCAWE) of unleaded gasoline showed no reproductive or developmental effects in rats exposed to concentrations up to 20, 000 mg/m3 (approx. 8000 ppm).

---CHRONIC TOXICOLOGY (SUMMARY)---

A lifetime mouse skin painting study of unleaded gasoline applied at 50 microliters, three times weekly, resulted in some severe skin irritation and changes, but no statistically significant increase in skin cancer or cancer to any other organ. A lifetime inhalation study of vaporized unleaded gasoline at up to 2000 ppm caused liver tumors in female mice and increased kidney tumors in male rats. The kidney tumors resulted from the formation of a compound unique to male rats, and are not considered relevant to humans. The U.S. EPA Risk Assessment Forum concluded that the male rat kidney tumor results are not relevant for human risk assessment. The implications for the female mice liver tumor data for human risk assessment have not been fully determined. Multiple short-term cancer predicative tests (Ames Test, etc.) have routinely been negative (no cancer or mutagenic potential) for unleaded gasoline.

---SENSITIZATION (SUMMARY)---

Unleaded gasoline was not a skin sensitizer in tests in a Buehler Guinea Pig Sensitization Assay.

---OTHER TOXICOLOGY DATA---

Gasoline and Refinery Streams: Isolated constituents of gasoline may display these or other potential hazards in laboratory tests. Gasoline consists of a complex blend of petroleum/processing derived paraffinic, olefinic, naphthenic and aromatic hydrocarbons which include up to 5% benzene (with 1-2 % typical in the U.S.), n-hexane, mixed xylenes, toluene, ethylbenzene and trimethyl benzene. Benzene has also caused damage to the fetus of test animals in developmental studies. Benzene has tested positive (mutagenic) in a number of short-term cancer/mutation predicative tests. Repeated exposures to low levels of benzene (50-500 ppm) have been reported to result in blood abnormalities including anemia and, in rare cases, leukemia in both animals and humans. Prolonged exposure to n-hexane may result in a condition known as peripheral neuropathy. This is nervous system damage

and is characterized by numbness of the extremities and, in extreme cases, paralysis. This product contains ethylbenzene. The International Agency for Research on Cancer (IARC) has evaluated ethylbenzene and classified it as possibly carcinogenic to humans (Group 2B) based on sufficient evidence for carcinogenicity in experimental animals, but inadequate evidence for cancer in exposed humans. Methyl Tertiary Butyl Ether (MTBE) was tested for carcinogenicity, neurotoxicity, chronic, reproductive, and developmental toxicity. The NOAEL for all end points evaluated in three animal species was 400 ppm or greater. An increase in kidney tumors/damage and liver tumors was observed in animals exposed to high concentrations of MTBE. Some embryo/fetal toxicity and birth defects were observed in the offspring of pregnant mice exposed to maternally toxic doses of MTBE, however the offspring of exposed pregnant rabbits were unaffected. The significance of the animal findings at high exposures are not believed to be directly related to potential human health hazards in the workplace.

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12. ECOLOGICAL INFORMATION

ENVIRONMENTAL FATE AND EFFECTS:

In the absence of specific environmental data for this product, this assessment is based on information for representative substances.

ECOTOXICITY: Based on test results for similar products, this substance may be toxic to aquatic organisms such as algae and daphnia (EL50/ IrL50 =1-10 mg/L). This substance has also been shown to be toxic to fish (LL50 = 1-10 mg/L).

MOBILITY: Dissolution of the higher molecular weight hydrocarbon components in water will be limited, but losses through sediment adsorption may be significant.

PERSISTENCE AND DEGRADABILITY: The majority of the components in this product are expected to be inherently biodegradable. When released into the environment, some of the constituents of gasoline will volatilize and be photodegraded in the atmosphere. The less volatile, more water-soluble components which are aromatic hydrocarbons will also undergo aqueous photodegradation.

BIOACCUMULATIVE POTENTIAL: Not established.

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13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL: Product is suitable for burning for fuel value in compliance with applicable laws and regulations and consideration of product characteristics at time of disposal.

RCRA INFORMATION: Disposal of unused product may be subject to RCRA regulations (40 CFR 261). Disposal of the used product may also be regulated due to ignitability, corrosivity, reactivity, or

toxicity as determined by the Toxicity Characteristic Leaching Procedure (TCLP).
BENZENE: 2.0000 PCT (TCLP)
FLASH: < -40(-40) C(F)

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14. TRANSPORT INFORMATION

USA DOT:

SHIPPING NAME:	Gasoline
HAZARD CLASS & DIV:	3
ID NUMBER:	UN1203
ERG NUMBER:	128
PACKING GROUP:	PG II
STCC:	NE
DANGEROUS WHEN WET:	No
POISON:	No
LABEL(s):	Flammable Liquid
PLACARD(s):	Flammable
PRODUCT RQ:	NA
MARPOL III STATUS:	NA

RID/ADR:

HAZARD CLASS:	3
PACKING GROUP:	II
LABEL:	3
DANGER NUMBER:	33
UN NUMBER:	1203
SHIPPING NAME:	Gasoline
REMARKS:	NA

IMO:

HAZARD CLASS & DIV:	3
UN NUMBER:	1203
PACKING GROUP:	PG II
SHIPPING NAME:	Gasoline
LABEL(s):	Flammable Liquid
MARPOL III STATUS:	NA

ICAO/IATA:

HAZARD CLASS & DIV:	3
ID/UN Number:	1203
PACKING GROUP:	PG II
SHIPPING NAME:	Gasoline
SUBSIDIARY RISK:	NA
LABEL(s):	Flammable Liquid

STATIC ACCUMULATOR (50 picosiemens or less): YES

---

15. REGULATORY INFORMATION

US OSHA HAZARD COMMUNICATION STANDARD: Product assessed in accordance with OSHA 29 CFR 1910.1200 and determined to be hazardous.

EU Labeling: Product is dangerous as defined by the European Union

Dangerous Substances/Preparations Directives.

Symbol: F+ T N Extremely flammable, Toxic, Dangerous for the environment.

Risk Phrase(s): R12-45-38-65-67-51/53.
Extremely flammable. May cause cancer. Irritating to skin. Harmful: may cause lung damage if swallowed. Vapors may cause drowsiness and dizziness. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrase(s): S16-53-45-2-23-24-29-43-62.
Keep away from sources of ignition - No smoking. Avoid exposure - obtain special instructions before use. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Keep out of the reach of children. Do not breathe vapor. Avoid contact with skin. Do not empty into drains. In case of fire use foam/drypowder/CO2. If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

Contains: Low Boiling Point Naphtha.

Governmental Inventory Status: All components comply with TSCA, EINECS/ELINCS, AICS, METI, DSL, KOREA, and PHILIPPINES.

U.S. Superfund Amendments and Reauthorization Act (SARA) Title III:
This product contains no "EXTREMELY HAZARDOUS SUBSTANCES".

SARA (311/312) REPORTABLE HAZARD CATEGORIES:
FIRE CHRONIC ACUTE

This product contains the following SARA (313) Toxic Release Chemicals:

CHEMICAL NAME	CAS NUMBER	CONC.
BENZENE(COMPONENT ANALYSIS)	71-43-2	2%
PSEUDOCUMENE (1,2, 4-TRIMETHYLBENZENE)(COMPONENT ANALYSIS)	95-63-6	3%
ETHYL BENZENE(COMPONENT ANALYSIS)	100-41-4	3%
TOLUENE(COMPONENT ANALYSIS)	108-88-3	6%
N-HEXANE(COMPONENT ANALYSIS)	110-54-3	3%
XYLENES(COMPONENT ANALYSIS)	1330-20-7	10%
METHYL-TERT-BUTYL ETHER(COMPONENT ANALYSIS)	1634-04-4	<16%

The following product ingredients are cited on the lists below:

CHEMICAL NAME	CAS NUMBER	LIST CITATIONS *

GASOLINE		1, 8, 19, 20, 21, 23, 25
ETHYL ALCOHOL (COMPONENT ANALYSIS)	64-17-5	1, 6, 10, 18, 19, 20, 21, 23, 25, 26
BENZENE (COMPONENT ANALYSIS) (2.00%)	71-43-2	1, 2, 4, 6, 9, 10, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26
NAPHTHALENE (COMPONENT ANALYSIS) (0.50%)	91-20-3	16, 22
PSEUDOCUMENE (1,2, 4-TRIMETHYLBENZENE) (COMPONENT ANALYSIS)	95-63-6	1, 20, 24, 25
ETHYL BENZENE (COMPONENT ANALYSIS)	100-41-4	1, 8, 10, 18, 19, 20, 21, 23, 24, 25, 26
TOLUENE (COMPONENT ANALYSIS) (6.00%)	108-88-3	1, 10, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26
N-HEXANE (COMPONENT ANALYSIS)	110-54-3	1, 10, 18, 19, 20, 21, 23, 24, 25, 26
XYLENES (COMPONENT ANALYSIS) (10.00%)	1330-20-7	1, 10, 18, 19, 20, 21, 22, 23, 24, 25, 26
METHYL-TERT-BUTYL ETHER (COMPONENT ANALYSIS)	1634-04-4	1, 21, 24, 25
TRIMETHYL BENZENE (COMPONENT ANALYSIS)	25551-13-7	1, 10, 18, 19, 20, 21, 23, 25, 26

--- REGULATORY LISTS SEARCHED ---

1=ACGIH ALL	6=IARC 1	11=TSCA 4	16=CA P65 CARC	21=LA RTK
2=ACGIH A1	7=IARC 2A	12=TSCA 5a2	17=CA P65 REPRO	22=MI 293
3=ACGIH A2	8=IARC 2B	13=TSCA 5e	18=CA RTK	23=MN RTK
4=NTP CARC	9=OSHA CARC	14=TSCA 6	19=FL RTK	24=NJ RTK
5=NTP SUS	10=OSHA Z	15=TSCA 12b	20=IL RTK	25=PA RTK
				26=RI RTK

* EPA recently added new chemical substances to its TSCA Section 4 test rules. Please contact the supplier to confirm whether the ingredients in this product currently appear on a TSCA 4 or TSCA 12b list.
Code key:CARC=Carcinogen; SUS=Suspected Carcinogen; REPRO=Reproductive

16. OTHER INFORMATION

USE: UNLEADED MOTOR FUEL

NOTE: PRODUCTS OF EXXON MOBIL CORPORATION AND ITS AFFILIATED COMPANIES ARE NOT FORMULATED TO CONTAIN PCBS.

Health studies have shown that many hydrocarbons pose potential human health risks which may vary from person to person. Information provided on this MSDS reflects intended use. This product should not be used for other applications. In any case, the following advice should be

considered:

INJECTION INJURY WARNING: If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

Precautionary Label Text:

CONTAINS GASOLINE, BENZENE, AND ETHYLBENZENE

DANGER!

EXTREMELY FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE. CAUSES SKIN IRRITATION. RESPIRATORY IRRITATION, HEADACHE, DIZZINESS, NAUSEA, LOSS OF CONSCIOUSNESS, AND IN CASES OF EXTREME EXPOSURE, POSSIBLY DEATH. LOW VISCOSITY MATERIAL-IF SWALLOWED, MAY BE ASPIRATED AND CAN CAUSE SERIOUS OR FATAL LUNG DAMAGE.

OVEREXPOSURE TO BENZENE MAY RESULT IN CANCER, BLOOD DISORDERS, AND DAMAGE TO THE BONE MARROW. LONG-TERM EXPOSURE TO GASOLINE VAPOR HAS CAUSED KIDNEY AND LIVER CANCER IN LABORATORY ANIMIALS, BLOOD EFFECTS, AND NERVOUS SYSTEM DAMAGE.

Keep away from heat, sparks, and flame. Avoid all personal contact. Avoid prolonged breathing of vapor. Use with adequate ventilation. Keep container closed. Approved portable containers must be properly grounded when transferring fuel. For use as a motor fuel only. Misuse of gasoline may cause serious injury or illness. Never siphon by mouth. Not to be used as a solvent or skin cleaning agent.

FIRST AID: In case of contact, wash skin with soap and water. Immediately remove contaminated clothing, including shoes. Destroy or wash clothing before reuse. If swallowed, seek immediate medical attention. Do not induce vomiting. Only induce vomiting at the instruction of a physician.

This warning is given to comply with California Health and Safety Code 25249.6 and does not constitute an admission or a waiver of rights. This product contains a chemical known to the State of California to cause cancer, birth defects, or other reproductive harm. Chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm are created by the combustion of this product. Refer to product Material Safety Data Sheet for further safety and health information.

****

For Internal Use Only: MHC: 1* 1* 1* 1* 2*, MPPEC: CF, TRN: 123455-20, CMCS97: EMGF20, REQ: PS+C, SAFE USE: G
EHS Approval Date: 03APR2003

****

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Prepared by: ExxonMobil Oil Corporation
Environmental Health and Safety Department, Clinton, USA

MATERIAL SAFETY DATA SHEET (MSDS)

Methyl Tert-Butyl Ether

(PRODUCT NAME)

Lyondell

(MANUFACTURED BY)

This Material Safety Data Sheet (MSDS) has been prepared in compliance with the federal OSHA hazard communication standard, 29 CFR 1910.1200. The information in this MSDS should be provided to all who will use, handle, store, transport, or otherwise be exposed to this product. This information has been prepared for the guidance of plant engineering, operations and management and for persons working with or handling this product. Gallade Chemical believes this information to be reliable and up to date as of the date of publication but, makes no warranty that it is.

DISTRIBUTED BY GALLADE CHEMICAL

www.galladechem.com

info@galladechem.com

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LYONDELL

Material Safety Data Sheet

MSDS No.: BE273
Variant: U.S.A.-EN
Version No: 1.4
Validation Date: 04/17/2002

ARCOPURE® (HIGH PURITY MTBE)

SECTION 1: IDENTIFICATION

Product Name: ARCOPURE® (HIGH PURITY MTBE)

Product Number: 000000000000499113

Chemical Name: t-Butyl Methyl Ether

CAS Number: 1634-04-4

Chemical Family: Alkyl ethers

Synonyms: High Purity Tert-Butyl Methyl Ether, High Purity MTBE, Tert-Butyl Methyl Ether

Manufacturer:
Lyondell Chemical Company
One Houston Center, Suite 1600
1221 McKinney St.
P.O. Box 2583
Houston Texas 77252-2583

Telephone Numbers:
Emergency: CHEMTREC 800 424-9300
LYONDELL 800-245-4532

Non-Emergency: CUSTOMER SERVICE
888 777-0232
PRODUCT SAFETY
800 700-0946

SECTION 2 : Composition/Information on Ingredients

Component Name:	CAS #.	EU Inventory Number:	Concentration by Wt./Mol% Avg.	Min.	Max.
t-Butyl Methyl Ether	1634-04-4	EINECS 216-653-1		99.9	

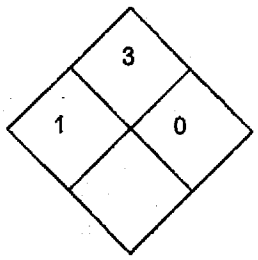
SECTION 3: HAZARD IDENTIFICATION

Emergency Overview This material is HAZARDOUS by OSHA Hazard Communication definition.

Signal Word: DANGER.

Hazards: Extremely flammable liquid. Skin and eye irritant. Mucous membrane irritant. Inhalation hazard. Aspiration hazard.

NFPA



HMIS®

Health	1
Flammability	3
Reactivity	0

Physical State: Liquid.

Color: Clear, colorless.

Odor: Terpene-like odor.

Odor Threshold: 0.051 ppm / Odor is not an adequate warning of potentially hazardous ambient air concentrations.

Potential Health Effects

Routes of Exposure: Skin. Eye Inhalation

Signs and Symptoms of Acute Exposure: See component summary.

- *t-Butyl Methyl Ether* — Eye irritant. Moderate skin irritant. Mucous membrane irritant. Overexposure may produce anesthetic or narcotic effects. Aspiration hazard.

Skin: May cause moderate skin irritation. No significant signs or symptoms indicative of any health hazard are expected to occur as a result of skin absorption exposure.

Inhalation: Prolonged overexposure may cause coughing, shortness of breath, dizziness and intoxication.

Eye: May cause minor eye irritation.

Ingestion: Ingestion of this material may result in aspiration into the lungs causing chemical pneumonia.

Chronic Health Effects: See component summary.

- *t-Butyl Methyl Ether* — Breathing mist or vapors may cause mucous membrane or upper respiratory tract irritation Prolonged exposure may produce anesthetic and narcotic effects. Chronic animal toxicity studies exposing rats and mice to MTBE have been performed. A description of these studies and an assessment of their results is presented elsewhere in this document.

Conditions Aggravated by Exposure: Medical information regarding special health effects is not conclusive. This material may aggravate pulmonary/bronchial disease and/or cause breathing difficulty.

SECTION 4: FIRST AID MEASURES

General: Assess rapidly and aggressively., Resuscitation may be indicated.

Inhalation: If overcome by exposure, remove victim to fresh air immediately. Give oxygen or artificial respiration as needed. Obtain medical attention if breathing difficulty persists.

Eye: Immediately flush the eyes with large amounts of clean low-pressure water for at least 15 minutes, occasionally lifting the upper and lower lids. If pain or irritation persists, promptly obtain medical attention.

Skin: Promptly remove soiled clothing/wash thoroughly before reuse. Wash skin thoroughly with mild soap and water. Flush with lukewarm water for 15 minutes. If sticky, use waterless cleaner first. Seek medical attention if ill effect or irritation develops.

Ingestion: If large quantity swallowed, give lukewarm water (pint/ 1/2 litre) if victim completely conscious/alert. Do not induce vomiting. Risk of damage to lungs exceeds poisoning risk. Obtain emergency medical attention.

Physician's Detoxification Procedures: Treat symptomatically. Treatment of overexposure should be directed at the control of symptoms and the clinical condition of the patient.

SECTION 5: FIRE FIGHTING MEASURES

Flammability Classification: OSHA/NFPA Class IC Flammable Liquid.

Flash Point / Method: ~ -28 °C(-18.4 °F)(SETA)

Auto-Ignition Temperature: 374 °C (705 °F)

Flammable Limits: LOWER: 1.3 vol%

UPPER: 8 vol%

Hazardous Combustion Products: Thermal decomposition may produce carbon monoxide and other toxic vapors.

Special Conditions to Avoid: Releases flammable vapors below normal ambient temperatures. Flammable vapors may be heavier than air. May travel long distances along the ground before igniting and flashing back to vapor source. When mixed with air and exposed to ignition source, vapors can burn in open or explode if confined.

Extinguishing Media: Suitable: SMALL FIRE: Use dry chemicals, CO2, water spray or alcohol-resistant foam. LARGE FIRE: Use water spray, water fog or alcohol-resistant foam.

Unsuitable: Do not use solid water stream/may spread fire.

Fire Fighting Instructions: Protective Equipment/Clothing: Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters protective clothing will only provide limited protection.

INSTRUCTIONS: Move containers form fire area if you can do it without risk. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after fire is out. Do not use straight streams. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. Always stay away from tanks engulfed in fire. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Release Response: Highly flammable liquid. Release can cause fire or explosion. Eliminate all sources of ignition. All equipment used when handling this product must be grounded. Do not touch or walk through spilled material. Stop leak if you can do it without risk. Prevent entry into waterways, sewers, basements or confined areas. A vapor suppressing foam may be used to reduce vapors. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Use clean non-sparking tools to collect absorbed material. Water spray may reduce vapor; but may not prevent ignition in closed spaces. Dike large

spills and place materials in salvage containers.

Regulation	Component	TPQ	RQ
EPA/DOT RQ	Methyl Tertiary Butyl Ether / CAS# 1634-04-4.		454 KG / 1,000 lbs

SECTION 7: HANDLING AND STORAGE

Handling: For industrial use only. Keep container tightly closed when not in use. Extinguish all ignition sources. Wear recommended personal protective equipment. Containers must be properly grounded before beginning transfer. All electrical equipment should be grounded and conform to applicable electric codes and regulatory requirements. Check atmosphere for explosiveness and oxygen deficiencies. Observe precautions pertaining to confined space entry. Use only non-sparking tools. Carefully vent any internal pressure before removing closure. Isolate, vent, drain, wash and purge systems or equipment before maintenance or repair. Handle empty containers with care; vapor/residue may be flammable.

Storage: Store only in tightly closed, properly vented containers away from heat, sparks, open flame and strong oxidizing agents. Soft steel; avoid most plastics, Viton and Flourel. Store closed drums with bung in up position. Vapor space above stored liquid may be flammable/explosive unless blanketed with inert gas.

SECTION 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION

Engineering Controls: Both local exhaust and good general room ventilation must be provided not only to control exposure but also to prevent formation of flammable mixtures.

Personal Protection:

Inhalation: A respiratory protection program that meets OSHA's 29 CFR 1910.134 or ANSI Z88.2 requirements must be followed whenever workplace conditions warrant respirator use.

Skin: Wear chemical resistant gloves such as: Nitrile. or Polyvinyl Alcohol. Depending on the conditions of use, protective gloves, apron, boots, head and face protection should be worn.

Eye: Eye protection such as chemical splash goggles and/or face shield must be worn when possibility exists for eye contact due to splashing or spraying liquid, airborne particles, or vapor.

Other Hygienic Practices: Selection of appropriate personal protective equipment should be based on an evaluation of the performance characteristics of the protective equipment relative to the task(s) to be performed, conditions present, duration of use, and the hazards and/or potential hazards that may be encountered during use. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.

Recommended Work Practices Use good personal hygiene practices. Wash hands before eating, drinking, smoking, or using toilet facilities. Promptly remove soiled clothing/wash thoroughly before reuse.

Occupational Exposure Limits:

Component Name:	Source / Date	Value / Units	Type	Notation	Carcinogenic Listing*
t-Butyl Methyl Ether	US (ACGIH) / 2001	50 ppm 180 mg/m3	8 HRS / TWA.	No	4

	US (OSHA) / 2001	N/L			4

*1 = OSHA 2 = IARC 3 = NTP 4 = Others N/L = Not Listed See Section 11 for more information

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Specific Gravity: ~0.74, @ (20 °C/68 °F), (Water = 1.0 at 4°C (39.2°F))

Vapor: ~3, @ (20 °C/68 °F), (Air = 1.0)

Boiling Point: ~ 55 °C/131 °F, @ 760 mm Hg

pH: Not applicable.

Vapor Pressure: ~ 245 mm Hg, @ (25 °C /77 °F)

Viscosity: ~ 0.3 mPa.s, @ (25 °C/77 °F)

Solubility: **Solubility (Water):**
Moderate (1 to less than 10 Percent).

Octanol/Water Partition Coefficient in Kow: Log Pow = -0.8 to -1.33

Melting/ Freezing Point: ~ -109 °C/-164 °F

Evaporation Rate: No Data Available.

Molecular Weight: 88.17 g/mol

Other Physical & Chemical Properties: Additional properties may be listed in Sections 3 and 5.

SECTION 10: STABILITY AND REACTIVITY

Chemical Stability: This material is stable when properly handled and stored.

Conditions to Avoid: Heat, sparks, open flame, other ignition sources, and oxidizing conditions.

Incompatibility with: 2-Flourel(TM). Viton(TM). Strong oxidizing agents.

Hazardous Polymerization: Not expected to occur.

Reactions with Air and Water: Not expected to occur.

SECTION 11: TOXICOLOGICAL INFORMATION

Product Summary: (See Component Toxicity Information).

CARCINOGENICITY: See component summary.

Component Summary:

t-Butyl Methyl Ether

LC50 (Inhl)

Rat	23,576 PPM	4 HOURS

LD50 (Oral)

Rat	4 GM/KG

Target Organ Effects Methyl tertiary butyl ether (MTBE) showed a positive response in the mouse lymphoma assay. However, all other mutagenicity assays (Ames, SCE, chromosomal aberrations, Drosophila, in-vivo SCE) were negative. There has been a high incidence of false positives in the mouse lymphoma, and therefore, it can be concluded that this single positive finding does not indicate that MTBE is a potential mutagen.

Repeated Dose Toxicity Information on the subchronic and chronic toxicity of MTBE to humans was not found in the secondary sources searched. Laboratory rodents exposed to high doses or concentrations of MTBE exhibit blood chemistry changes and kidney abnormalities. The no observable effect level was reported to be 800 ppm. Chronic toxicity studies have been completed for MTBE. In these studies mice and rats were exposed to 400, 3000, or 8000 ppm MTBE vapors 6 hour/day, 5 days/week for life. Few adverse effects were noted for either rats or mice. Male and female mice exposed to 8000 ppm MTBE vapors developed a slightly higher incidence of benign liver tumors during their lifetime. No other adverse effects or increases in tumor incidences were found. Male and female rats exposed to MTBE vapors developed an increasing incidence of chronic progressive kidney damage - an effect typically noted in aging rats. These effects were most severe in 3000 and 8000 ppm exposure groups and were accompanied by an increased incidence of kidney tumors (males only). These findings are consistent with kidney damage associated with accumulation of protein in cells - an effect which may be unique to the male rat. Benign testicular tumors were numerically increased in high-dose MTBE male rats, but this is an age-related lesion which typically occurs in a very high proportion of control untreated rats. All of these effects either occur in tissues prone to the development of tumors or may occur by a mechanism not considered relevant to humans. The significance of these findings for human health hazard estimation is unclear.

CARCINOGENICITY: ACGIH list MTBE as A3: Animal carcinogen: Agent is carcinogenic in experimental animals at a relatively high dose, by route(s), or by mechanism(s) not considered relevant to workers exposure. Available epidemiologic studies do not confirm an increased risk of cancer in humans. Available evidence suggests that the agent is not likely to cause cancer in humans except under uncommon or unlikely routes or levels of exposure.

Reproductive / Development Effects MTBE, at very high exposure levels (8000 ppm), did induce developmental toxicity in mice, but only at levels where there was also maternal toxicity. In rabbits exposed to the same MTBE levels, there were no indications of any adverse health effects on the offspring, even in the presence of maternal toxicity. The abnormal findings in the mice (cleft palate, etc.) are well-recognized effects of stress in the pregnant mouse and have no correlation with developmental hazards in humans.

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicity: This material is expected to be non-hazardous to aquatic species.

Toxicity to Fish:/Amphibians

Test type	Species	Value / Units
LC50 / 96 HOURS	fathead minnow	706 mg/l

Toxicity to Aquatic: Inverterbrates:

Test type	Species	Value / Units
LC50 / 96 HOURS	Marine copepod.	> 1,000 mg/l

Environmental Fate: Abiotic Degradability: Oxidation Half-Life 5.7 days. Biotic Degradability: Theo BOD 1% (21 day). This material is volatile and water soluble. It may enter soil and may contaminate water. This material is likely to evaporate from soil and water.

Bioaccumulation: This material is not expected to bioaccumulate.

Biodegradation: This material is expected to be resistant to biodegradation.

SECTION 13: DISPOSAL CONSIDERATIONS

Contaminated products/soil/water may be Resource Conservation and Recovery Act (RCRA)/Occupational Safety and Health Administration (OSHA) hazardous waste due to low flash point (see 40 Code of Federal Regulations (CFR) 261 and 29 CFR 1910). Assure effluent complies with applicable regulations. Landfill solids at permitted sites. Use registered transporters. Burn concentrated liquids in systems designed for low flash point material. Avoid flame-outs. Assure emissions comply with applicable regulations. Avoid overloading/poisoning plant biomass. Dilute aqueous waste may biodegrade.

SECTION 14: TRANSPORT INFORMATION

Proper Shipping Name: Methyl tert-butyl ether

UN/NA ID: UN 2398

NAER Guidebook: 127

Marine Pollutant: No

Labels: Flammable liquid.

DOT Hazard Class: 3, PG II

IMDG Hazard Class: 3, PG II

ADR/VLG Hazard Class: 3

ICAO/IATA Hazard Class: 3, PG II

ADNR/VBG Hazard Class: 3

RID/VSG Hazard Class: 3

SECTION 15: REGULATORY INFORMATION

Regulatory Advisory: This material contains a component(s) with known CAS numbers classified as hazardous substances subject to the reporting of CERCLA (40 CFR 302) and/or to the release reporting requirements of SARA (Section 302) based on reportable quantities (RQs) (SEE SECTION 6).

Regulatory Status: All components of this product are listed or are exempt from listing on the TSCA 8(b) inventory. If identified components of this product are listed under the TSCA 12(b) Export Notification rule, they will be listed below. Export notification required.

Methyl t-Butyl Ether TSCA Section 4

SARA - Section 313 Emissions Reporting: This material contains the following chemicals with known CAS numbers subject to the reporting requirements of SARA Title III, Section 313 and 40 CFR 372:

Component Summary:	Reporting Threshold
Methyl t-Butyl Ether / CAS# 1634-04-4	1.0%

SARA - Section 311/312: Based upon available information, this material is classified as the following health and/or physical hazards according to Section 311 & 312:

Fire Hazard.
Immediate (Acute) Health Hazard.

State Reporting:

- This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins under California Proposition 65 at levels which would be subject to the proposition.

- Massachusetts Substances List (MSL) - Hazardous substances on the MSL must be identified when present in materials at levels greater than state specified criterion. The criterion is: >= 1%. Components with CAS numbers present in this material at a level which could require reporting under the statute are:

  Methyl Tertiary Butyl Ether / CAS# 1634-04-4.

- Hazardous Substances listed by the State of Pennsylvania must be identified when present in materials at levels greater than the state specified criterion. The criterion is >= 1%. Components with CAS numbers in this material at a level which could require reporting under the statute are:

  Methyl Tertiary Butyl Ether / CAS# 1634-04-4.

- Environmentally Hazardous Substances listed by the State of Pennsylvania must be identified when present in materials at levels greater than the state specified criterion. The criterion is >= 1%. Components with CAS numbers in this material at a level which could require reporting under the statute are:

  Methyl Tertiary Butyl Ether / CAS# 1634-04-4.

SECTION 16: OTHER INFORMATION

DISCLAIMER OF RESPONSIBILITY: This document is generated for the purpose of distributing health, safety, and environmental data. It is not a specification sheet nor should any displayed data be construed as a specification. The information on this MSDS was obtained from sources which we believe are reliable. However, the information is provided without any warranty, expressed or implied, regarding its correctness. Some information presented and conclusions drawn herein are from sources other than direct test data on the substance itself. The conditions or methods of handling, storage, use and

disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage, or expense arising out of or in any way connected with handling, storage, use, or disposal of this product. If the product is used as a component in another product, this MSDS information may not be applicable.

Latest Revision(s): Revised Section(s): 14 Date of Revision: December 4 2001

END OF DOCUMENT

ExxonMobil

123455-22 DIESEL #2, ON-ROAD (LOW SULFUR)
MATERIAL SAFETY DATA BULLETIN

---

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: DIESEL #2, ON-ROAD (LOW SULFUR)
SUPPLIER: EXXONMOBIL OIL CORPORATION
3225 GALLOWS RD.
FAIRFAX, VA 22037

24 - Hour Health and Safety Emergency (call collect): 609-737-4411

24 - Hour Transportation Emergency:
CHEMTREC: 800-424-9300 202-483-7616
LUBES AND FUELS: 281-834-3296

Product and Technical Information:
Lubricants and Specialties: 800-662-4525 800-443-9966
Fuels Products: 800-947-9147
MSDS Fax on Demand: 713-613-3661
MSDS Internet Website: http://www.exxon.com, http://www.mobil.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

CHEMICAL NAMES AND SYNONYMS: HYDROCARBONS AND ADDITIVES

GLOBALLY REPORTABLE MSDS INGREDIENTS:

Substance Name	Approx. Wt%
DIESEL FUEL (68334-30-5)	100

COMPONENT(S) OF PRODUCT INGREDIENTS INCLUDE:

NAPHTHALENE (91-20-3)	0.5
ETHYL BENZENE (100-41-4)	0.5

NOTE: Composition may contain up to 0.5% performance additive.

See Section 8 for exposure limits (if applicable).

3. HAZARDS IDENTIFICATION

This product is considered hazardous according to regulatory guidelines (See Section 15).

EMERGENCY OVERVIEW: Clear (May Be Dyed) Liquid. Material is combustible. Liquid can release vapors that readily form flammable mixtures at or above the flash point. Product can accumulate a static charge which may cause a fire or explosion. DOT ERG No. : 128

POTENTIAL HEALTH EFFECTS: Respiratory irritation, headache, dizziness, nausea, loss of consciousness, and in cases of extreme exposure, possibly death. Diesel exhaust may cause lung cancer. Prolonged, repeated skin contact may result in skin irritation or more serious skin disorders. Low viscosity material-if swallowed may enter the lungs and cause lung damage. Note: This product contains polycyclic aromatic hydrocarbons, some of which have been reported to cause skin cancer in test animals and in humans under conditions of poor personal hygiene and prolonged repeated contact.

POTENTIAL ENVIRONMENTAL EFFECTS: Toxic to aquatic organisms; may cause long-term adverse effects in the aquatic environment.

For further health effects/toxicological data, see Section 11.

4. FIRST AID MEASURES

EYE CONTACT: Flush thoroughly with water. If irritation occurs, call a physician.

SKIN CONTACT: Remove contaminated clothing. Dry wipe exposed skin and cleanse yourself with waterless hand cleaner and follow by washing thoroughly with soap and water. For those providing assistance, avoid further contact to yourself or others. Wear impervious gloves. Launder contaminated clothing separately before reuse. Discard contaminated articles that cannot be laundered. (See Section 16 - Injection Injury)

INHALATION: Remove from further exposure. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with mechanical device or use mouth-to-mouth resuscitation.

INGESTION: Seek immediate medical attention. Do not induce vomiting.

NOTE TO PHYSICIANS: Material if aspirated into the lungs may cause chemical pneumonitis. PRE-EXISTING MEDICAL CONDITIONS WHICH MAY BE AGGRAVATED BY EXPOSURE: Hydrocarbon Solvents/Petroleum Hydrocarbons- Skin contact may aggravate an existing dermatitis.

5. FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA: Carbon dioxide, foam, dry chemical and water fog.

SPECIAL FIRE FIGHTING PROCEDURES: Water may be ineffective, but water should be used to keep fire-exposed containers cool. Prevent runoff from fire control or dilution from entering streams,

sewers, or drinking water supply.
SPECIAL PROTECTIVE EQUIPMENT: For fires in enclosed areas, fire fighters must use self-contained breathing apparatus.
UNUSUAL FIRE AND EXPLOSION HAZARDS: Material is combustible. Liquid can release vapors that readily form flammable mixtures at or above the flash point. Product can accumulate a static charge which may cause a fire or explosion.
COMBUSTION PRODUCTS: Fumes, smoke, carbon monoxide, sulfur oxides, aldehydes and other decomposition products, in the case of incomplete combustion.
Flash Point C(F): > 55(131) (ASTM D-93).
Flammable Limits (approx.% vol.in air) - LEL: 0.6%, UEL: 7.0%
NFPA HAZARD ID: Health: 1; Flammability: 2, Reactivity: 0

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6. ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES: Report spills/releases as required to appropriate authorities. U.S. Coast Guard and EPA regulations require immediate reporting of spills/releases that could reach any waterway including intermittent dry creeks. Report spill/release to Coast Guard National Response Center toll free number (800)424-8802. In case of accident or road spill notify CHEMTREC (800) 424-9300.
PROCEDURES IF MATERIAL IS RELEASED OR SPILLED:
LAND SPILL: Eliminate sources of ignition. Shut off source taking normal safety precautions. Take measures to minimize the effects on ground water. Recover by pumping using explosion-proof equipment or contain spilled liquid with sand or other suitable absorbent and remove mechanically into containers. If necessary, dispose of adsorbed residues as directed in Section 13.
WATER SPILL: Eliminate sources of ignition and warn other ships in the vicinity to stay clear. Notify port and other relevant authorities. Confine with booms if skimming equipment is avaliable to recover the spill. Otherwise disperse in unconfined waters, if permitted by local authorities and environmental agencies. If permitted by regulatory authorities the use of suitable dispersants should be considered where recommended in local oil spill procedures.
ENVIRONMENTAL PRECAUTIONS: Prevent material from entering sewers, water sources or low lying areas; advise the relevant authorities if it has, or if it contaminates soil/vegetation.
PERSONAL PRECAUTIONS: See Section 8

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7. HANDLING AND STORAGE

HANDLING: Keep product away from high energy ignition sources, heat, sparks, pilot lights, static electricity, and open flame. Harmful in contact with or if absorbed through the skin. Avoid inhalation of vapors or mists. Use in well ventilated area away from all ignition sources. See Section 8 for additional personal protection advice when handling this product.
STORAGE: Store in a cool area. Avoid sparking conditions. Ground and bond all transfer equipment.
SPECIAL PRECAUTIONS: To prevent and minimize fire or explosion risk from static accumulation and discharge, effectively bond and/or

ground product transfer system. Do not use electronic devices (including but not limited to cellular phones, computers, calculators, pagers, etc.) in or around any fueling operation or storage area unless the devices are certified intrinsically safe by an approved national testing agency and to the safety standards required by national and/or local laws and regulations. Electrical equipment and fittings must comply with local fire prevention regulations for this class of product. Use the correct grounding procedures. Refer to national or local regulations covering safety at petroleum handling and storage areas for this product.

EMPTY CONTAINER WARNING: Empty containers retain residue (liquid and/or vapor) and can be dangerous. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH. Do not attempt to refill or clean container since residue is difficult to remove. Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS:

ExxonMobil recommends an 8-hour time-weighted average (TWA) exposure of 500 mg/m3 total vapor (approx. 100 ppm) or 5 mg/m3 stable aerosols.

		---TWA---		----STEL---		NOTE
Substance Name (CAS-No.)	Source	ppm	mg/m3	ppm	mg/m3	
NAPHTHALENE (91-20-3)						
	OSHA	10	50	15	75	
	ACGIH	10	52	15	79	
ETHYL BENZENE (100-41-4)						
	OSHA	100	435	125	545	
	ACGIH	100	434	125	543	

NOTE: Limits shown for guidance only. Follow applicable regulations.

VENTILATION: Use in well ventilated area with local exhaust ventilation. Ventilation equipment must be explosion proof. Use away from all ignition sources.

RESPIRATORY PROTECTION: Approved respiratory equipment must be used when airborne concentrations are unknown or exceed the recommended exposure limit. Self-contained breathing apparatus may be required for use in confined or enclosed spaces.

EYE PROTECTION: If splash with liquid is possible, chemical type goggles should be worn.

SKIN PROTECTION: Impervious gloves must be worn. If contact is likely

oil impervious clothing must be worn. Good personal hygiene practices should always be followed.

9. PHYSICAL AND CHEMICAL PROPERTIES

Typical physical properties are given below. Consult Product Data Sheet for specific details.

APPEARANCE: Liquid
COLOR: Clear (May Be Dyed)
ODOR: Hydrocarbon
ODOR THRESHOLD-ppm: NE
pH: NA
BOILING POINT C(F): > 149(300)
MELTING POINT C(F): NA
FLASH POINT C(F): > 55(131) (ASTM D-93)
FLAMMABILITY (solids): NE
AUTO FLAMMABILITY C(F): NE
EXPLOSIVE PROPERTIES: NA
OXIDIZING PROPERTIES: NA
VAPOR PRESSURE-mmHg 20 C: 0.5
VAPOR DENSITY: > 2.0
EVAPORATION RATE: NE
RELATIVE DENSITY, 15/4 C: 0.82-0.87
SOLUBILITY IN WATER: Negligible
PARTITION COEFFICIENT: > 3.5
VISCOSITY AT 40 C, cSt: > 1.0
VISCOSITY AT 100 C, cSt: NE
POUR POINT C(F): < -7(20)
FREEZING POINT C(F): NE
VOLATILE ORGANIC COMPOUND: NE
DMSO EXTRACT, IP-346 (WT.%): NA
NA=NOT APPLICABLE NE=NOT ESTABLISHED D=DECOMPOSES

FOR FURTHER TECHNICAL INFORMATION, CONTACT YOUR MARKETING REPRESENTATIVE

10. STABILITY AND REACTIVITY

STABILITY (THERMAL, LIGHT, ETC.): Stable.
CONDITIONS TO AVOID: Extreme heat and high energy sources of ignition.
INCOMPATIBILITY (MATERIALS TO AVOID): Halogens, strong acids, alkalies, and oxidizers.
HAZARDOUS DECOMPOSITION PRODUCTS: Product does not decompose at ambient temperatures.
HAZARDOUS POLYMERIZATION: Will not occur.

11. TOXICOLOGICAL DATA

---ACUTE TOXICOLOGY---

ORAL TOXICITY (RATS): Practically non-toxic (LD50: greater than 2000 mg/kg). ---Based on testing of similar products and/or the components.
DERMAL TOXICITY (RABBITS): Practically non-toxic (LD50: greater than 2000 mg/kg). ---Based on testing of similar products and/or the

components.

INHALATION TOXICITY (RATS): Practically non-toxic (LC50: greater than 5 mg/l). ---Based on testing of similar products and/or the components.

EYE IRRITATION (RABBITS): Practically non-irritating. (Draize score: greater than 6 but 15 or less). ---Based on testing of similar products and/or the components.

SKIN IRRITATION (RABBITS): Practically non-irritating. (Primary Irritation Index: greater than 0.5 but less than 3). ---Based on testing of similar products and/or the components.

---SUBCHRONIC TOXICOLOGY (SUMMARY)---

Repeated dermal application of middle distillates, heating oils and diesel oils to rabbits for 2-4 weeks at up to 1 gm/kg resulted in strong to severe skin irritation with some weight loss at the higher dose. Toxic effects ranging from weight loss to mortality was observed in rabbits treated repeatedly with very high doses (6 gm/kg) of these oils. Repeated inhalation exposure of middle distillate and diesel vapor and aerosol to rats for 2-4 weeks at up to 6 mg/l resulted in respiratory tract irritation, lung changes/infiltration/accumulation, and some reduction in lung function.

---REPRODUCTIVE TOXICOLOGY (SUMMARY)---

Diesel fuel vapors were tested in an inhalation teratology (developmental toxicity) study in rats and when only minimal maternal toxicity was observed, no fetotoxic or developmental effects were observed. A developmental toxicity study of dermally applied middle distillates did indicate fetotoxicity (reduced litter size, litter weight, increased resorptions) at doses that also caused significant maternal toxicity.

---CHRONIC TOXICOLOGY (SUMMARY)---

Diesel fuel, heating oil and middle distillates have been shown to be carcinogenic in lifetime mouse skin painting bioassays. While in some cases, the tumor incidence is low in the test populations and possibly associated with skin irritation, concurrent evidence from short-term predicative tests (Modified Ames) does indicate some level of mutagenic activity associated with levels of polycylic aromatic compounds in certain test samples.

---SENSITIZATION (SUMMARY)---

Middle distillate oils were not skin sensitizers when tested in a Modified Buehler Guinea Pig Sensitization Assay.

---OTHER TOXICOLOGY DATA---

Overexposure to diesel exhaust fumes may result in eye irritation, headaches, nausea, and respiratory irritation. Animal studies involving lifetime exposure to high levels of diesel exhaust have produced variable results, with some studies indicating a potential for lung cancer. Limited evidence from epidemiological studies suggest an association between long-term occupational exposure to diesel engine emissions and lung cancer. Diesel engine exhaust typically consists of gases and particulates, including carbon dioxide, carbon monoxide, nitrogen compounds, oxides of sulfur, and hydrocarbons. Diesel exhaust composition will vary with fuel, engine type, load cycle, engine maintenance,

tuning and exhaust gas treatment. Use of adequate ventilation and/or respiratory protection in the presence of diesel exhaust is recommended to minimize exposures. This product contains ethylbenzene. The International Agency for Research on Cancer (IARC) has evaluated ethylbenzene and classified it as possibly carcinogenic to humans (Group 2B) based on sufficient evidence for carcinogenicity in experimental animals, but inadequate evidence for cancer in exposed humans.

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12. ECOLOGICAL INFORMATION

ENVIRONMENTAL FATE AND EFFECTS:

In the absence of specific environmental data for this product, this assessment is based on information for representative substances.

ECOTOXICITY: Based on test results for similar products, this substance may be toxic to aquatic organisms such as algae and daphnia (EL50/ IrL50 =1-10 mg/L). This substance has also been shown to be toxic to specific fish species (LL50 = 1-10 mg/L for rainbow trout, Atlantic silverside).

MOBILITY: Dissolution of the higher molecular weight hydrocarbon components in water will be limited, but losses through sediment adsorption may be significant.

PERSISTENCE AND DEGRADABILITY: The majority of the components in this product are expected to be inherently biodegradable. The consitituents of diesel fuels/heating oil which are volatilized will photodegrade in the atmosphere. The less volatile, more water-soluble components which are aromatic hydrocarbons will also undergo aqueous photodegradation.

BIOACCUMULATIVE POTENTIAL: Not established.

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13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL: Product is suitable for burning for fuel value in compliance with applicable laws and regulations.

RCRA INFORMATION: Disposal of unused product may be subject to RCRA regulations (40 CFR 261). Disposal of the used product may also be regulated due to ignitability, corrosivity, reactivity, or toxicity as determined by the Toxicity Characteristic Leaching Procedure (TCLP).

FLASH: > 55(131) C(F)

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14. TRANSPORT INFORMATION

NOTE:The flash point of this material is > 131F. Regulatory classifications vary as follows:

DOT: Flammable Liquid OR Combustible Liquid - (49CFR 173.120(b)(2))
OSHA: Combustible Liquid
IATA/IMO: Flammable Liquid

USA DOT:

SHIPPING NAME:	Diesel Fuel
HAZARD CLASS & DIV:	COMBUSTIBLE LIQUID
ID NUMBER:	NA1993
ERG NUMBER:	128
PACKING GROUP:	PG III
STCC:	NE
DANGEROUS WHEN WET:	No
POISON:	No
LABEL(s):	NA
PLACARD(s):	Combustible
PRODUCT RQ:	NA
MARPOL III STATUS:	NA

RID/ADR:

HAZARD CLASS:	3
PACKING GROUP:	III
LABEL:	3
DANGER NUMBER:	30
UN NUMBER:	1202
SHIPPING NAME:	Gas Oil
REMARKS:	NA

IMO:

HAZARD CLASS & DIV:	3
UN NUMBER:	1202
PACKING GROUP:	PG III
SHIPPING NAME:	Gas Oil
LABEL(s):	Flammable Liquid
MARPOL III STATUS:	NA

ICAO/IATA:

HAZARD CLASS & DIV:	3
ID/UN Number:	1202
PACKING GROUP:	PG III
SHIPPING NAME:	Gas Oil
SUBSIDIARY RISK:	NA
LABEL(s):	Flammable Liquid

STATIC ACCUMULATOR (50 picosiemens or less): YES

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15. REGULATORY INFORMATION

US OSHA HAZARD COMMUNICATION STANDARD: Product assessed in accordance with OSHA 29 CFR 1910.1200 and determined to be hazardous.

EU Labeling: Product is dangerous as defined by the European Union Dangerous Substances/Preparations Directives.

Symbol: Xn N Harmful, Dangerous for the environment.

Risk Phrase(s): R40-65-66-51/53.
Limited evidence of a carcinogenic effect. Harmful: may cause lung damage if swallowed. Repeated exposure may cause skin dryness or cracking. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrase(s): S24-2-36/37-62.
Avoid contact with skin. Keep out of the reach of children. Wear suitable protective clothing and gloves. If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

Contains: Gas oil - unspecified.

Governmental Inventory Status: All components comply with TSCA, EINECS/ELINCS, AICS, METI, DSL, KOREA, and PHILIPPINES.

U.S. Superfund Amendments and Reauthorization Act (SARA) Title III:
This product contains no "EXTREMELY HAZARDOUS SUBSTANCES".

SARA (311/312) REPORTABLE HAZARD CATEGORIES:
FIRE CHRONIC ACUTE

This product contains the following SARA (313) Toxic Release Chemicals:

CHEMICAL NAME	CAS NUMBER	CONC.
ETHYL BENZENE(COMPONENT ANALYSIS)	100-41-4	0.5%

The following product ingredients are cited on the lists below:

CHEMICAL NAME	CAS NUMBER	LIST CITATIONS *
NAPHTHALENE (COMPONENT ANALYSIS) (0.50%)	91-20-3	16, 22
ETHYL BENZENE (COMPONENT ANALYSIS)	100-41-4	1, 8, 24
DIESEL OIL..C9-20	68334-30-5	21, 26

--- REGULATORY LISTS SEARCHED ---

1=ACGIH ALL	6=IARC 1	11=TSCA 4	16=CA P65 CARC	21=LA RTK
2=ACGIH A1	7=IARC 2A	12=TSCA 5a2	17=CA P65 REPRO	22=MI 293
3=ACGIH A2	8=IARC 2B	13=TSCA 5e	18=CA RTK	23=MN RTK
4=NTP CARC	9=OSHA CARC	14=TSCA 6	19=FL RTK	24=NJ RTK
5=NTP SUS	10=OSHA Z	15=TSCA 12b	20=IL RTK	25=PA RTK
				26=RI RTK

* EPA recently added new chemical substances to its TSCA Section 4 test rules. Please contact the supplier to confirm whether the ingredients in this product currently appear on a TSCA 4 or TSCA 12b list.

Code key:CARC=Carcinogen; SUS=Suspected Carcinogen; REPRO=Reproductive

16. OTHER INFORMATION

USE: DIESEL FUEL

NOTE: PRODUCTS OF EXXON MOBIL CORPORATION AND ITS AFFILIATED COMPANIES ARE NOT FORMULATED TO CONTAIN PCBS.

Health studies have shown that many hydrocarbons pose potential human health risks which may vary from person to person. Information provided on this MSDS reflects intended use. This product should not be used for other applications. In any case, the following advice should be considered:

INJECTION INJURY WARNING: If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

Precautionary Label Text:

CONTAINS DIESEL OIL.. C9-20

WARNING!

COMBUSTIBLE LIQUID AND VAPOR. RESPIRATORY IRRITATION, HEADACHE, DIZZINESS, NAUSEA, LOSS OF CONSCIOUSNESS, AND IN CASES OF EXTREME EXPOSURE, POSSIBLY DEATH. LOW VISCOSITY MATERIAL-IF SWALLOWED, MAY BE ASPIRATED AND CAN CAUSE SERIOUS OR FATAL LUNG DAMAGE.

MAY CAUSE SKIN CANCER ON PROLONGED, REPEATED SKIN CONTACT. ANIMAL SKIN ABSORPTION STUDIES RESULTED IN INCREASED MORTALITY, EFFECTS ON BODY WEIGHT, THE IMMUNE SYSTEM AND THE UNBORN CHILD. PROLONGED, REPEATED SKIN CONTACT MAY CAUSE IRRITATION. DIESEL EXHAUST MAY CAUSE LUNG CANCER.

Keep away from heat and flame. Avoid prolonged or repeated overexposure by skin contact or inhalation. Use with adequate ventilation. Keep container closed. Keep out of reach of children.

FIRST AID: If inhaled, remove from further exposure. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation. In case of contact, remove contaminated clothing. Dry wipe the exposed skin and cleanse with waterless hand cleaner and follow by washing thoroughly with soap and water. For those providing assistance, avoid further skin contact to yourself and others. Wear impervious gloves. If swallowed, seek immediate medical attention. Do not induce vomiting. Only induce vomiting at the instruction of a physician.

This warning is given to comply with California Health and Safety Code 25249.6 and does not constitute an admission or a waiver of rights. This product contains a chemical known to the State of California to cause cancer, birth defects, or other reproductive harm. Chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm are created by the combustion of this product. Refer to product Material Safety Data Sheet for further safety and health information.

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For Internal Use Only: MHC: 1* 1* 1* 1* 1*, MPPEC: C, TRN: 123455-22, CMCS97: EMGF22, REQ: PS+C, SAFE USE: C
EHS Approval Date: 03APR2003

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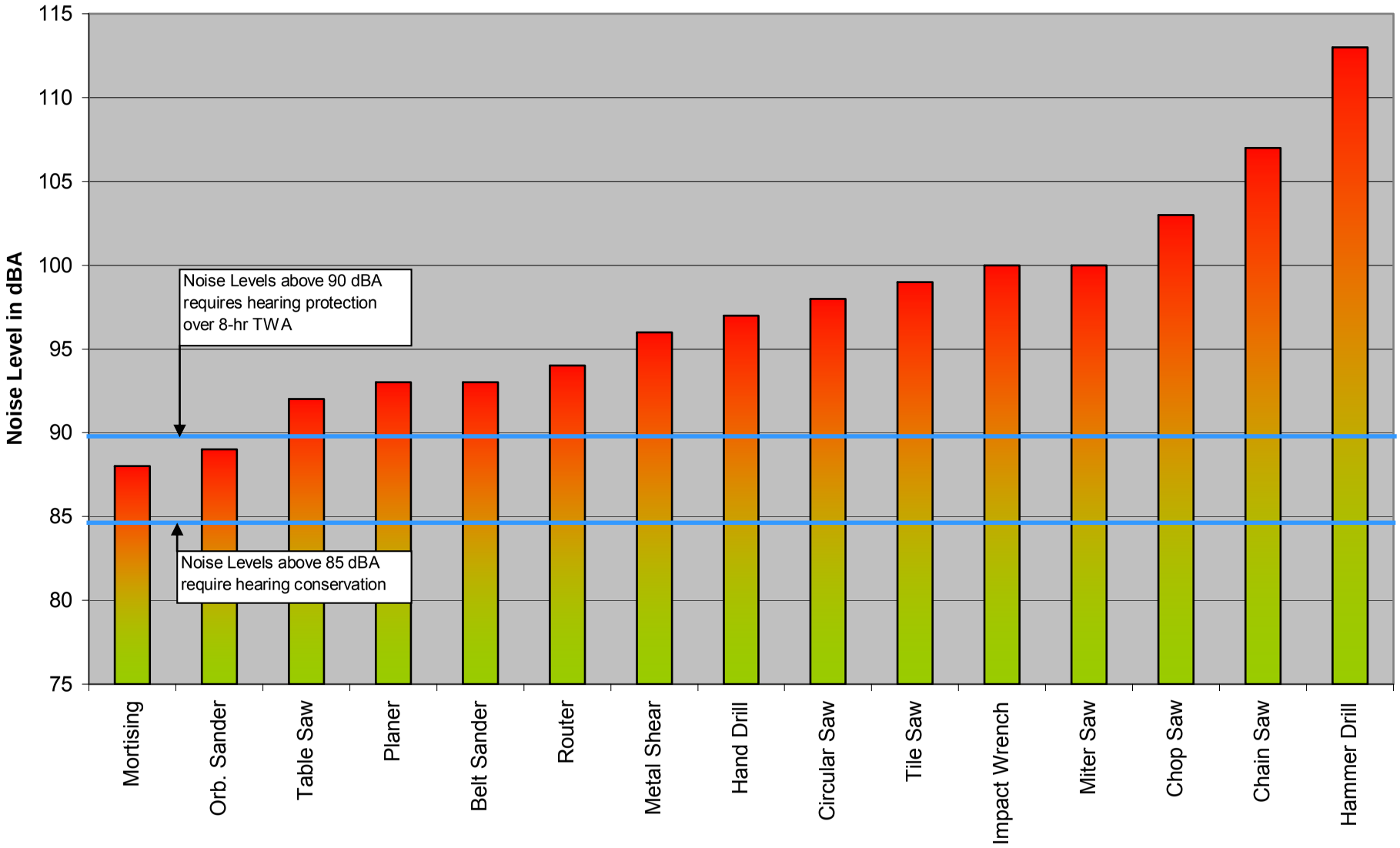
Prepared by: ExxonMobil Oil Corporation
Environmental Health and Safety Department, Clinton, USA

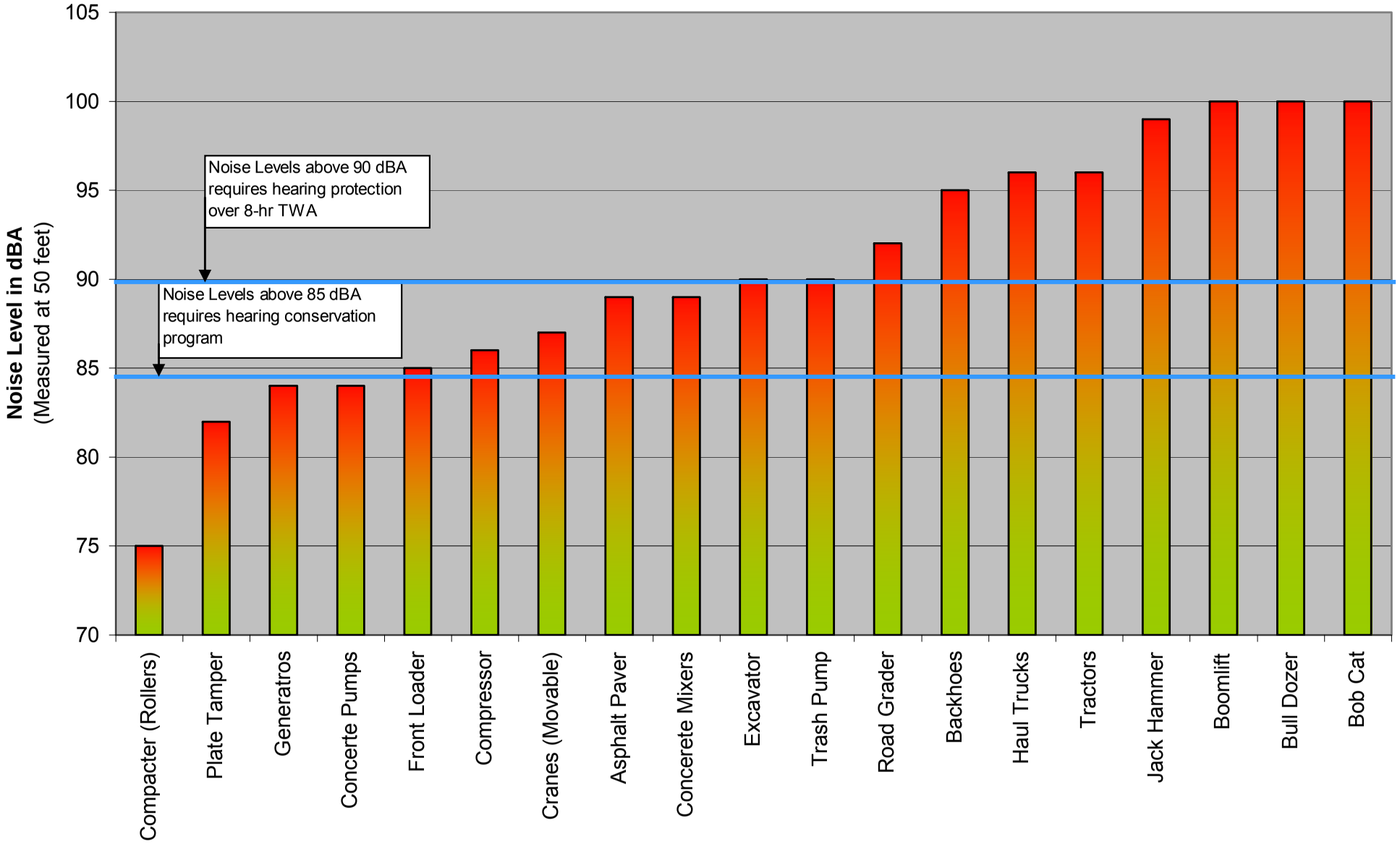
APPENDIX D

TYPICAL NOISE LEVEL MEASUREMENTS FROM CONSTRUCTION RELATED TOOLS

Noise Levels From Typical Construction Hand Tools



Noise Levels From Typical Construction Heavy Equipment



APPENDIX E

JOB SAFETY ANALYSIS DOCUMENTS FOR TASK SPECIFIC HAZARD MITIGATION

ExxonMobil Refining & Supply - Global Remediation
JOB SAFETY ANALYSIS

COMPANY/PROJECT NAME or ID/LOCATION (City, State)		[ ] NEW [X] REVISED as of 1/1/10	3 PAGES

WORK ACTIVITY: **DRILLING OVERSIGHT HOLLOWSTEM AUGER**

Drilling hazard activities covered are: tailgate safety meeting, clearing boring location, drill rig setup, ground disturbance, ground intrusion, bin/drum management, and site cleanup and drum relocation.

DEVELOPMENT TEAM	POSITION/TITLE	REVIEWED BY	POSITION/TITLE
Jennifer Lacy	LPS Manager	Peter Petro	Corporate H&S Manager
Ryan Pozzuto	Staff Scientist	Jennifer Lacy	LPS Manager
Phil Cordell	Staff Geologist	Janice Jacobson	Project Manager

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE CRITICAL ACTIONS FOR TASK-SPECIFIC REQUIREMENTS)

[X]	REFLECTIVE VEST	[ ]	GOGGLES	[ ]	AIR PURIFYING	[X]	GLOVES (Nitrile & Cut Resistant)
[X]	HARD HAT	[ ]	FACE SHIELD	[ ]	RESPIRATOR	[X]	WHEEL CHOCKS
[ ]	LIFELINE/HARNESS	[X]	HEARING PROTECTION	[ ]	SUPPLIED RESPIRATOR	[ ]	OTHER
[X]	SAFETY GLASSES	[X]	SAFETY SHOES	[X]	PPE CLOTHING: Long sleeve protection required		

[1] JOB STEPS	[2] POTENTIAL HAZARDS	[3] CRITICAL ACTIONS TO MITIGATE HAZARDS
1. Conduct Tail Gate Safety Meeting	• Inattention to Safety Procedures	•All employees prior to implementing this task will review the general site activity JSA, task specific JSAs and Health and Safety Plan to identify potential and actual hazards present, and controls for those hazards
2. Review ExxonMobil Tier I Drill Rig Best Practice Check List	• Drilling hazards due to missing safety equipment or improperly maintained equipment	•Complete drill rig check list to verify drilling rig is in best possible operational shape for safe drilling.
		• Do not drill if significant safety issue or equipment has failed or is missing.
3. Clearing Boring Location	• Slips/Trips/Falls	• Keep work area free of excess materials and debris
		• Remove all trip hazards by keeping materials/objects organized
		• If open boreholes are present, cover with hole plate to secure when not immediately working on the borehole.
	• Contact with Underground Utilities	• Follow ExxonMobil's Subsurface Clearing Protocol
		• Use air knife equipment to clear hole to a minimum of 4 feet below grade with a diameter at least 3 inches larger than the auger.
		• In critical zone, the borehole must be cleared to 8 feet below grade.
		• If utilities are suspected below 8 feet, clear to 1/2 foot below deepest known dept, if depth exceeds borehole capabilities check with PM before drilling
		• Wear the appropriate PPE including goggles, level 3 cut resistant gloves, hard hat, and ear protection.
		• Contact Underground Services Alert (USA) 48 hours prior to digging
		• Contact a private utility locator to locate utilities prior to digging
4. Drill Rig Set Up	• Rig Roll Over	• Do not move rig with the mast raised
		• Cross all hills and obstructions head on
		• Set riggers prior to raising mast
		• Where unstable soil exists, the soil should be assessed by a qualified professional to ensure safe conditions exist.
	• Contact with Electric Lines and Other Overhead Obstructions	• Position rig to avoid overhead utility lines by distance defined by voltage and local regulations (minimum 10 ft for up to 35KV)
		• Use a spotter when raising mast to confirm clearance of overhead lines and other obstructions.

[1] JOB STEPS	[2] POTENTIAL HAZARDS	[3] CRITICAL ACTIONS TO MITIGATE HAZARDS
4. Drill Rig Set Up	• Rig Movement	• Heavy equipment should be equipped with a back-up alarm or use horn and spotter when backing
		• Stay clear of operating equipment and rig when moving
		• Ensure that the "Hands Free" program is in use.
		• Inspect area behind vehicle before backing
		• Use a spotter when backing and agree on hand signals before moving rig.
5. Ground Disturbance: Auger Boring Advancement/Direct Push Drill Rods (Requires Hot Work Permit and OIMS Subsurface Protocol)	• Faulty or Inappropriate Equipment	• Qualified driller must inspect drill rig prior to use; if found faulty and/or inappropriate, do not proceed until repaired or replaced
		• Inspect all hand tools prior to use; if found faulty or inappropriate, do not proceed until repaired or replaced.
	• Operating Equipment	• Clear area of obstructions and communicate with all workers involved that drilling is beginning.
		• Stay clear of rotating auger/rods
		• Secure loose clothing, long hair and remove loose jewerly which can become entangled in or caugh on equipment
		• Wear PPE including level 3 cut resistant gloves, goggles, and safety shoes
		• Ensure that the "Hands Free" program is in use.
	• Suspended Loads	• Do not walk under suspended loads
		• When possible, remove overhead hazards promptly
		• Wear PPE including hard hat and safety shoes.
	• High Noise Levels	• Use hearing protection when equipment is operating
	• Vapors and Airborne Particulates	• Monitor air concentrations using direct-reading, real-time instruments such as a LEL and/or PID meter(s)
		• Stop work if hazardous conditions arise as identified in the SSP, until hazard is removed by taking the following actions in order: implementing administrative controls, implementing engineering controls, upgrade PPE.
		• Wear PPE including goggles, and dust masks or respirators
		• Stay upwind whenever possible
	• Impact to Subsurface Lines/Tanks	• Only drill in areas where underground features have been identified and cleared per SCP. If hole has to be moved, clear new location with air/water knife equipment first
		• Wear PPE including level 3 cut resistant gloves and hard hat.
6. Air Monitoring	• Exposure to vapor and airborne contaminants	• While monitoring the air near a boring, keep yourself as far away as possible from the potential contaminants
		• Set up the PID to retain the highest value to eliminate having to continually read the display screen
		• Consider the use of an extension for the PID/LEL to increase the distance between the bore hole and the monitoring personnel
		• Don a respirator if the concentration reaches 100 PPM in your breathing air or sooner if you feel bother by vapors
		• Notify all workers if the concentrations exceed 100 PPM in their breathing air
		• If the concentrations exceed 100 PPM, increase the monitoring frequency to 7 minutes or between each auger change
7. Ground Intrusion: Split Spoon Sampler (Requires Hot Work Permit and OIMS Subsurface Protocol)	• Faulty Equipment	• Ensure that driller inspects rope/cable/rod for wear, fraying, oils, and moisture prior to use; do not use if faulty until repaired or replaced
		• Ensure that driller inspects cathead for rust and rope grooves prior to use; do not use if faulty until repaired or replaced.
	• Moving Equipment	• Do not wrap rope around any part of the hand or body
		• Wear PPE including level 3 cut resistant and nitrile over gloves
8. Ensure bins/drums are properly secured and labeled	• Bins/drums could be removed from the sites and disposed of improperly or tampered with	▪ Ensure correct signage and labeling is present on each side of bin and/or drum
		• Ensure a chain and lock is present on the bin "picking eye" to discourage inadvertent bin removal.
		▪ Ensure bin top is secured and/or temporary fencing is secured

[1] JOB STEPS	[2] POTENTIAL HAZARDS	[3] CRITICAL ACTIONS TO MITIGATE HAZARDS
9. Perform site cleanup/drum relocation	• Back or muscle injury from moving heavy objects	▪ Conduct SPSA and keep alert for potential risk
		▪ Review Drum Management JSA
		▪ Wear appropriate PPE including: cut resistant under glove and nitril over glove and goggles
	• Slips/Trips and falls hazards	▪ Perform final site inspection to ensure well boxes are properly secured
10. Weather	• Lightning strike	▪ Count the seconds between the flash and bang.
		▪ Every 5 seconds equals one mile. Greater than 30 seconds you are clear, but 30 seconds are less means boom down and get to shelter.
		▪ All clear is 30 minutes from the last flash and bang that was 30 seconds or greater.
	• High wind	▪ Check with operator for maximum wind speeds at the end of the boom.
		▪ If wind approaches the maximum safe wind speed, boom down until wind speed decreases.
		▪ Wait 30 minutes after wind speed decreases.

ExxonMobil Refining & Supply - Global Remediation
JOB SAFETY ANALYSIS

COMPANY/PROJECT NAME or ID/LOCATION (City, State)		[ ] NEW [X] REVISED as of 1/28/2010	2 PAGES

WORK ACTIVITY: **GROUNDWATER SAMPLING**

Routine sampling of groundwater wells both on site and off site. Working on well heads in driveways and near pump islands.

DEVELOPMENT TEAM	POSITION/TITLE	REVIEWED BY	POSITION/TITLE
James Matthiessen	Project Manager, WA	Peter Petro	Corporate H&S Manager
Amanda Balzer	Sr. Staff Geologist, WA	Kaden Reed	Sr. Environmental Technician
		Kyle Haslam	Sr. Environmental Technician

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE CRITICAL ACTIONS FOR TASK-SPECIFIC REQUIREMENTS)

[X] REFLECTIVE VEST	[ ] GOGGLES	[ ] AIR PURIFYING	[X] GLOVES (Cut resistant & nitrile)
[ ] HARD HAT	[ ] FACE SHIELD	[ ] RESPIRATOR	[ ] OTHER:
[ ] LIFELINE/HARNESS	[ ] HEARING PROTECTION	[ ] SUPPLIED RESPIRATOR	
[X] SAFETY GLASSES	[X] SAFETY SHOES	[X] PPE CLOTHING: Long sleeve protection required	

[1] JOB STEPS	[2] POTENTIAL HAZARDS	[3] CRITICAL ACTIONS TO MITIGATE HAZARDS
1. Tailgate Health and Safety Meeting	• Inattention to safety procedures	• All employees assigned to this task will attend a tailgate health and safety meeting, which will include the pertinent JSA, Site Safety plan (SSP), traffic control plan, types of potential hazards and actual hazards present, and controls for those hazards.
2. Maneuvering Vehicle/Trailer On Site	•Collision with person/vehicle/property	• Communicate with other personnel on site
		• Visually assess pathway before relocating vehicle
		• Clear communication between spotter and driver, including agreed position for spotter
	• Items falling from truck	• Drive with the tailgate closed whenever possible. If the tailgate must remain open, strap down any loose items.
3. Handling Equipment/Removing Well Lids	•Over Exertion- Lifting Heavy Equipment	•Do not lift anything >40 lbs without assistance bend and lift using legs/arms, not your back.
	•Coming into contact with sharp and/or heavy objects	•Wear cut resistant level 3 gloves and safety shoes as defined by ANSI Z41.
	•Coming into Contact with objects Slips/Trips/Falls	•If lid is removable store as close as possible, but clear of potential walkways to avoid tripping hazards
4. Locking and Unlocking Well Caps	• Exposure to Contaminants, biological hazards	• Wear cut resistant level 3 under and Nitrile over gloves
		• Ensure well cap is effectively sealing well and properly locked
		• Watch for spiders and other insects before putting hands into well vaults. Use tool (screw driver) and visual inspection to explore well vault before reaching in with gloved hand.
	•Water inside well vault	• Use small cup or hand pump and cut resistant/nitrile gloves to remove water from vault. Guard against splashes.
5. Purging Wells	• Exposure to Biological: Insects, Snakes, Wildlife and Vegetation	•Use tool (screw driver) and visual inspection to explore well vault before reaching in with gloved hand.
	• Splash hazard when gauging wells	• Safety glasses with side shields must be worn at all times. • Nitrile/cut resistant gloves must be worn while handling the bailer.
	• Exposure to Vapors and Airborne particulates	• Monitor air conditions, stop work if excessive gasoline odors are present in well. 100 PPM EMES OEL, 300 PPM is OSHA PEL
		•Wear safety glasses with side shields and respirator if high gasoline concentration conditions exist. Greater than >100 PPM XOM OEL and 300 PPM is OSHA PEL. Employee can wear respirator at lower concentrations if discomfort or irritation occurs.
		• Keep lids closed on poly tanks and drums as much as possible.
	•Contact with contaminated materials or exposure to standing water in well vault	• Wear face shield and water proof Tyvek if high splash hazards exist.
	• Heavy Objects/Lids/Covers	• Wear cut resistant under and Nitrile over gloves
		• Keep hands/fingers away from raised covers
		• Use hand tools to initially lift and hold heavy covers
5. Purging Wells	• Heavy Objects/Lids/Covers	• Left with legs and arms, do not bend back to lift heavy covers and equipment.

[1] JOB STEPS	[2] POTENTIAL HAZARDS	[3] CRITICAL ACTIONS TO MITIGATE HAZARDS
6. Collecting Groundwater Samples	• Contact with sharp objects (broken Sampling Bottles)	• Use clear glass VOAs
		• Visually inspect each glass bottle for defects prior to use.
		• Wear cut-resistant gloves under Nitrile gloves while handling glass sample bottles.
	• Sample bottle falling and breaking	• Large sample containers must be secured in event it tips. Place large sample container in plastic tote or box to secured while opening, filling and closing container.
		• Review Sample Packing SOP before packing and shipping samples.
7. Cleaning Up and Departing the Site	• Slips, trips and falls	• Ensure that well covers are secure upon departure, and that all tools and bailing equipment are removed from the site.
		• Walk around site and vehicle to perform a visual inspection before demobilization
	• Demobilization	• Review Driving JSA

1 Each Job or Operation consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the associated hazards in Column 2

2 A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (included slips and trips); **Exertion** -excessive strain or stress / ergonomics / lifting techniques; **Exposure** - inhalation / skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught"

3 Aligning with the first two columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective observable and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

APPENDIX F

PERSONAL PROTECTIVE CLOTHING/GLOVES INSPECTION AND DONNING AND DOFFING PROCEDURES

Personal Protective Equipment
Donning and Doffing Instructions

Donning Non-Encapsulating Garments

1. Conduct a visual inspection of the garment before you begin donning: -garment should be free of discoloration, alterations or physical damage -inner gloves should be fully inserted into outer gloves
2. Remove all jewelry and personal items (pens, key rings, badges, pagers, knife cases, etc.) that might damage the garment.
3. Check function of respirator and place nearby donning location.
4. Visually check size and condition of outer boots and place nearby.
5. Open the garment closure completely.
6. Read the garment size label to assure proper fit.
7. Apply anti-fog to inside of visor, if present.
8. Remove your shoes. If the garment has attached socks, these socks are worn inside outer chemical boots. These socks do not have adequate durability or slip resistance to be worn as the outer footwear covering.
9. While sitting, insert your feet into the garment legs and down into socks, if so equipped. Stretch your legs out to maximum extension while pulling garment up around hips.
10. If the garment has outer boot top covers, pull the boot top covers up and don outer boots. Then pull boot top cover down over boots as far as possible. If the garment does not have socks, pull the garment cuff up before donning the boot, then pull the cuff down over the outside of the boot.
11. Place one hand in the sleeve and pull the garment sleeve to your shoulder. Make sure your hand is securely inside the glove, if attached.
12. Place your other hand in the sleeve and glove, if attached, and pull the garment over that shoulder.
13. If gloves are not attached to the garment, don the gloves. Pull the sleeves of the garment over the gauntlet of the gloves. Do not rely upon taping to provide a liquid-tight seal. Taping should only be used to hold the sleeve in position over the glove gauntlet. If a leak-proof seal between the glove and sleeve is required, then you should wear a garment with attached gloves.
14. Don your respirator facepiece and check its function. If using an SCBA, disconnect the air supply from the facepiece, if possible, to save air supply.
15. Don protective headgear, if it is worn underneath the garment hood, and communication equipment.
16. Place the attached hood, if present, over your head and close the zipper.
17. After checking that the zipper is completely closed, fold and secure the flaps over the closure.
18. In the case of an air-line breathing system, complete all connections and adjustments.
19. Connect your respirator facepiece to the air supply and make sure the respirator is functioning properly.
20. If applicable, place the separate hood over your head and attach the underarm straps.

Personal Protective Equipment
Donning and Doffing Instructions

Doffing Non-Encapsulating Garments

Gross decontamination and removal of all personal protective equipment will be performed before leaving the site. Contaminated clothing will be carefully removed to minimize the dislodgment of particulate and collected in a drum for disposal. Respiratory protection will be kept on until the removal of contaminated clothing has been completed.

Shaking or blowing dust or other materials off potentially contaminated clothing or equipment to remove dust or other materials is not permitted. If dust removal is required, a vacuum cleaner designed for the removal of toxic materials and outfitted with high-efficiency particulate filtration (HEPA) that is 99.97 percent efficient again particles of 0.3 micron size or larger

Non-Encapsulating Garments

1. If your garment has been contaminated or is suspected of being contaminated, you must first undergo field decontamination.
2. After field decontamination, if the garment has been contaminated or is suspected of being contaminated, you should continue to use your respirator until the garment has been doffed and removed.
3. An assistant should help you doff the garment after field decontamination. If your garment has been contaminated, your assistant should wear protective clothing and respiratory equipment.
4. Remove and discard the separate outer hood if present.
5. If you are wearing an SCBA or PAPR, your assistant should help you remove the backpack or filter unit without disconnecting the facepiece. The tank or filter unit should either be held by another person or placed in a dry, secure position. While you stand, your assistant should partially open the closure of your garment, pull down the hood, open the closure completely and peel the garment down and away from your shoulders. The assistant should help you remove your arms from the sleeves.
6. You assistant should lower the garment below your the hips without touching the inside of the garment.
7. While sitting, your assistant should help you remove your boots, pull the garment off your legs and take the garment away.
8. Once the garment has been removed, you can disconnect and remove the respiratory facepiece.

Doffing Chemical Resistant Gloves

Using the Personal Protective Equipment (PPE) correctly is another link in the chain of keeping a person safe. If the PPE is not worn or used correctly then it may not offer the expected protection to the user. Below are guidelines for putting on (donning) and removing gloves (doffing).

Personal Protective Equipment
Donning and Doffing Instructions

Donning Gloves

1. Wash hand before putting gloves on.
2. Remove all jewelry from hands.
3. Pick up one glove with the right hand
4. Line the thumb side of the glove up with the thumb side of the left hand
5. Slip the open end of the glove over the left hand and thumb
6. Stretch the palm side of the glove with the right hand, pulling the glove on to finger level.
7. Position the fingers of the glove in line with the fingers of the left hand.
8. Pull the remainder of the glove onto the left hand.
9. Pick up the second glove with the gloved left hand.
10. Line the thumb side of the glove up with the thumb side of the right hand.
11. Slip the open end of the glove over the right hand and thumb.
12. Stretch the palm side of the glove with the left hand; pull the glove on to finger level.
13. Position the fingers of the glove in line with fingers of the right hand.
14. Pull the remainder of the glove onto the right hand.
15. Proceed with activity requiring gloves.

Personal Protective Equipment
Donning and Doffing Instructions

Doffing Gloves

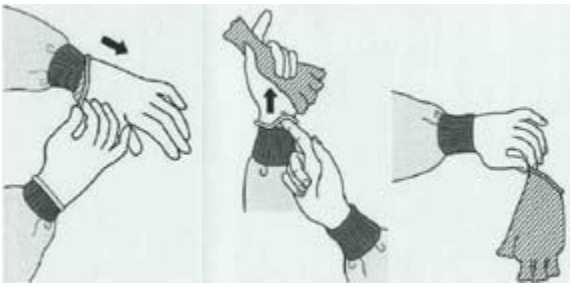
There are two standard methods to taking off gloves. Method One for glove removal is recommended, because it is harder for a person to become contaminated. However, if Method Two can be done without causing contamination, use the easiest method. Below are both methods.

Method One:

1. Grasp one of the gloves and cuff and pull it partway off. The glove will turn inside out. It is important to keep the first glove partially on your hand before removing the second glove. This protects you from touching the outside of either glove with your bare hands.
2. Leaving the first glove over your fingers, grasp the second glove near the cuff and pull it part of the way off. The glove will turn inside out. It is important to keep the second glove partially on your hand to protect you form touching the outside surface of the first glove with your bare hand.
3. Pull off the two gloves at the same time, being careful to touch only the inside surfaces of the gloves with your bare hands.
4. Dispose of the gloves properly in accordance with waste disposal regulations.
5. Wash hands thoroughly

Method Two:

1. Grasp outside edge near wrist.
2. Peel away from hand turning glove inside-out.
3. Hold in opposite gloved hand.
4. Slide ungloved finger under the wrist of the remaining glove, be careful not to touch the outside of the glove.
5. Peel off from inside, creating a bag for both gloves
6. Discard
7. Wash hands thoroughly



Personal Protective Equipment
Donning and Doffing Instructions

Do's and Don'ts of Glove Use

1. Work from clean to dirty—this will help prevent contamination
2. Don't touch your face or adjust PPE with contaminated gloves
3. Change gloves when heavily soiled or if they are torn.
4. Discard gloves after use, never wash or reuse disposable gloves.

Reference:
Donning and Doffing non-encapsulating garments instructions obtained from DoPont Personal Protective Equipment, June 2007.

APPENDIX G

EXXONMOBIL WORK PERMIT

EMGR WORK PERMIT
AND LOCKOUT / TAGOUT

PERMIT TYPE: ❑ Cold ❑ Hot Work ❑ Confined Space Entry ❑ Excavation

WORK LOCATION/SITE NUMBERI	AREA OF WORKI

DESCRIPTION OF WORK COVERED BY THIS PERMIT:

DESCRIBE EQUIPMENT/MACHINERY/TOOLS TO BE USED:

NAME AND COMPANY OF CONTRACTOR RESPONSIBLE FOR AUTHORIZING WORK:	PHONE NUMBER:
PRIMARY FIELD CONTACT:	PHONE NUMBER:

NAME S OF PERSONNEL COVERED BY THIS PERMIT	DATE PERMIT ISSUED:	FOR TIME FRAMEI ☐ AM ☐ PM

WORK PERMIT DURATION IS ONE WORK DAY (DATE PERMIT ISSUED)

EMERGENCY PHONE NUMBERS: FIRE _____ POLICE _____ SHERIFF: _____

HOSPITAL/MEDICAL: _____ OTHER: _____ EM PM Notified? ☐ YES ☐ N/A

A. PREWORK CHECKLIST-JOBSITE INSPECTION REQUIRED	YES	NO	NA
1. JSA And/Or Detailed Work Procedures Reviewed/Available? List Procedure / Date _____			
2. GR Project Site Workers Understand GR and Site-Specific Safety Roles & Practices Including Review/Sgning of HASP?			
3. Safety Procedures, Alarms, Equipment Safety Devices and Evacuation Routes Identified and Communicated To All Workers?			
4. Work Permit Requirements Including Work Limitations Have Been Communicated To and Are Understood By All Workers?			
5. Affected Personnel (e.g. Site Owner) Have Been Notified? If Yes, Name/Date _____			
6. Required Agency Notifieations Completed? If Yes, Name/Date _____			
7. Work Involves Interconnecting Areas? If Yes, Verbal Endorsement of Affected Received _____			
8. Job Site Inspected by Permit Issuer and Recipient?			
9. Sewers In Immediate Area Protected from Spills/Sparks?			
10. Precautions Taken To Prevent Leaks / Spills and Other Impacts to Workers/Environment?			
11. The Affect Of This Job On Neighboring Equipment, Third Party And/Or Public Considered and Addressed?			
12. Hazardous Materials MSDSs Reviewed and Understood for: ☐ Asbestos ☐ Acid/Caustic ☐ Lead / Paint ☐ H2S ☐ Hot Material ☐ Flammables ☐ Product _____ ☐ Other _____			
13. Subsurface Disturbance Required? If Yes, Check Box and List Potential Undergroud Items at site. ☐ Product lines ☐ Cathodic protection ☐ Sewer lines ☐ Electric lines ☐ Communication lines ☐ Water lines ☐ Gas ☐ Other _____			
SCP Checklist Completed and Public Utilities Notifications Made? If Yes, Notification Confirmation # _____			

	YES	NO	NA
14. Lockout/Tagout Procedures Reviewed With Authorized Personnel?			
15. Equipment Has Been ☐ Blinded ☐ Isolated ☐ Gas Freed ☐ Drained/Cleaned/Flushed ☐ Depressurized			
16. Work Site Warning Devices In Place (barricades, cones, warning signs, guarded walkways and work areas)?			
17. Eyewash, Showers, Safety Blankets Identified and Operable?			
18. Area Tested and Cleared Of Flammable/Combustible Materials for Hot Work, Hazardous Environment for Confined Space Entry?			
19. Motorized Equipment / Vehicles Permitted in Work Area?			
20. Personnel Involved With The Work Are Trained And Under-Stand The Hot Work And/Or Confined Space Entry Procedures?			
21. Fire Equipment Required On Site? ☐ Fire Hose and Nozzle ☐ Fire Watch ☐ Fire Extinguisher Size: _____ ☐ Fire Water Pressure ☐ Other _____			
22. Personal Protective Equipment Required (Check Box Or List) ☐ Hard Hat ☐ Safety Shoes ☐ Gloves (Type)_____ ☐ Safety Glasses ☐ Hearing Protection ☐ High Visibility Vest/Clothing ☐ Goggles ☐ Safety Harness ☐ Air Purifying Respirator ☐ Face Shield ☐ Flotation Device ☐ Air Supplying Respirator ☐ Special Lead/Asbestos/Welding PPE, Describe:_____ ☐ Other _____			
23. Gas Testing Equipment Used To Issue Permit			

Type of Equipment	Serial Number	Date Bump Tested	Equipment Owner

☐ Gas Testing Equipment has been calibrated and functioning properly
Calibration Documentation Form Is To Be Maintained In A Log With The Equipment

B. GAS TESTING REQUIRED ☐ YES ☐ NO (RECORD GAS TESTING INFORMATION ON PAGE 2) TESTER'S INITIALS:

GAS TESTER'S NAME/COMPANY/SIGNATURE:

C. LO/TO PROCEDURES TO BE FOLLOWED DOCUMENTED: ☐ YES ☐ NA

ENERGY SOURCES PRESENT — DEVICES TO BE LOCKED AND/OR TAGGED AND THEIR LOCATION

TYPE OF ENERGY	MAGNITUDE	DEVICE	LOCATION	LOCK #	TAG #	VERIFIED

TYPE: pressure, stored energy, cathodic protection, electricity, etc. MAGNITUDE: Examples: electricity - 220 volts AC; pressure - pounds per square inch (PSI); force - pounds (LBS)

LOCKOUT / TAGOUT AUTHORIZED PERSONNEL: _____ _____ _____ _____

D. CONFINED SPACE ENTRY REQUIRED: ☐ YES ☐ NO IF YES - COMPLETE SECTION(S) ON BACK OF "CONFINED SPACE ENTRY" PAGE
(CONTINUOUS AIR MONITORING REQUIRED FOR CONFINED SPACE ENTRY)

LIST OF AUTHORIZED ENTRANTS: (see Page 2 of Confined Space Entry Permit)

ACTIVE ENTRY SUPERVISOR:	RELIEVED BY:	TIME ☐ AM ☐ PM	ACTIVE ENTRY STANDBY:	RELIEVED BY:	TIME ☐ AM ☐ PM

RESCUE/EMERGENCY SERVICES REQUIRED: ☐ YES ☐ NO IF YES, TYPE OF RESCUE ☐ OFF-SITE SERVICE ☐ ON-SITE NON-ENTRY ☐ ON-SITE ENTRY ☐ EMERGENCY SERVICES

EMERGENCY RESCUE PROVIDED BY: (NAME OF SERVICE) _____ (NAME OF CONTACT) _____ (TELEPHONE NUMBER)	INITIATE EMERGENCY RESCUE BY:

ON-SITE RESCUE EQUIPMENT REQUIRED: ☐ SCBA ☐ CPR/FIRST AID KITS ☐ RESCUE BASKET ☐ MECHANICAL RETRIEVAL DEVICE ☐ WRITTEN RESCUE PLAN ☐ LIFELINE ☐ FULL BODY HARNESS ☐ ENTRANT/STANDBY COMMUNICATION _____

E. OTHER COMMENTS, SPECIAL PRECAUTIONS, ETC.

F. SIGNATURES

ISSUER NAME AND COMPANY:		RECIPIENT NAME AND COMPANY:	
ISSUER SIGNATURE:	TIME ☐ AM ☐ PM	RECIPIENT SIGNATURE:	TIME ☐ AM ☐ PM
RECIPIENT RELIEF NAME, COMPANY AND SIGNATURE			TIME ☐ AM ☐ PM

G. POSTWORK / JOB STATUS ☐ JOINT INSPECTION PERMIT REQUIRED NEXT DAY ☐ YES ☐ NO

AREA/EQUIPMENT SECURED AND CLEANED? ☐ YES ☐ NO COMMENTS:		WORK COMPLETED ☐ YES ☐ NO COMMENTS:	
INSPECTED BY (NAME AND SIGNATURE)	TIME ☐ AM ☐ PM	RECIPIENT NAME AND SIGNATURE	TIME ☐ AM ☐ PM

PERMIT REVIEWER'S NAME	PERMIT REVIEWER'S SIGNATURE	DATE	TIME ☐ AM ☐ PM

PROMINENTLY DISPLAY PERMIT AT JOBSITE

DEFINITION: Cold work is any work that does not provide a source of ignition.

If a Hot Work Permit or Confined Space Entry Permit are not required for work activities, a Cold Work Permit may be required as a risk control method based on field work risk assessment results, particularly if work involves a larger, more complex project that requires a significant level of engineering or field operations review to address increased safety precautions.

Larger, more complex projects include, but are not limited to:

- At an operating site or in a populated area where controlling access by third parties may be especially difficult (not intended to include typical retail remediation sites in urban area with controlled access)
- Unusually large scope (making it difficult to maintain coordination and to avoid unsafe interference between workers or tasks such as large workforce, fleet of mobile equipment or number of activities or tasks occurring simultaneously
- Involving unique remediation issues, plans or site characteristics (e.g. capping unconsolidated/unstable materials; methane or other potential safety or health hazards, severe weather limitations).

With exception of documenting completion of Lock Out/Tag Out (LOTO) procedures, Cold Work Permits may not be required when working at typical Retail sites and Major Projects non-operating facility sites provided hot work or confined space entry is not involved and other OIMS/LPS requirements (e.g. Job Safety Analyses (JSAs), Health and Safety Plans (HASPs), tailgate safety meetings, etc.) are implemented.

If work involves actual or potentially hazardous vapors in the area, a gas test must be conducted before a Cold Work Permit is issued.

The following Gas Detection Guidelines shall apply when issuing permits with project-specific PELs and testing methods based on local country requirements and potential chemical/gas exposure.

- Oxygen

23.5% **maximum** for entry and hot work.
19.5% **minimum** for entry without supplied breathing air. (Some facilities may not allow entry regardless of supplied breathing air until oxygen is 19.5% minimum to 23.5% maximum.)

- Lower Explosive Limit (LEL)

5% **maximum** LEL for entry without breathing air.
10% **maximum** LEL for routine entry procedures. 10% to 20% requires rescue special procedures to be implemented. **No entry above 20%.**
1% **maximum** LEL for hot work. Some sites may establish a limit of 0% until the source is determined.

- Permissible Exposure Limits (PEL's) for use without respirators (see MSDS, all values are **maximums**)
- Exceeding **ANY** maximum value requires use of respirators

NOTE: A nitrogen-enriched environment, which depletes oxygen, can be detected only with special instruments. High concentrations of N2 become particularly dangerous because workers may not be able to recognize physical or mental symptoms of overexposure, leading to asphyxiation.

The following gas detection guidelines shall apply when issuing permits for project activities with potential for exposure to hazardous environment. Project-specific exposure limits (e.g. PELs, STELs, TWAs) and testing methods must also be based on MSDS and local region requirements.

(NOTE: region-specific concentration limits may be lower)

To ensure proper documentation and retention of the required gas testing, readings must be recorded on this document in the space provided below.

GAS TEST REQUIRED	**o Yes o No**	**RECORD CONTINUOUS MONITORING EVERY TWO HOURS**			**TESTORS INITIALS:**												
CHEMICAL	NO RESPIRATOR REQUIRED	NO ROUTINE WORK PERMITTED	CONTINUOUS MONITORING REQUIRED	RESULT / TIME		RESULT / TIME		RESULT / TIME		RESULT / TIME		RESULT / TIME		RESULT / TIME		RESULT / TIME	
Oxygen	>19.5% to 23.5%	<19.5% OR >23.5%	o Yes o No														
%LEL (entry)	See Total Hydrocarbons	> 5 % LEL	o Yes o No														
%LEL (hot work)	See Total Hydrocarbons	> 1% LEL	o Yes o No														
Benzene	<0.5 ppm	≥500 ppm	o Yes o No														
Hydrogen Sulfide	≤10 ppm	≥100 ppm	o Yes o No														
Total Hydrocarbons	<100ppm	≥1,000 ppm	o Yes o No														
Other:	See MSDS	IDLH see MSDS	o Yes o No														
Other:	See MSDS	IDLH see MSDS	o Yes o No														
Other:	See MSDS	IDLH see MSDS	o Yes o No														

Nobody Gets Hurt

SAFE PERFORMANCE SELF ASSESSMENT

BEFORE BEGINNING ANY ACTIVITY/TASK/JOB:

ASSESS the risk!
What could go wrong?
What is the worst thing that could happen if something does go wrong?

ANALYZE how to reduce the risk!
Do I have all the necessary *Training* and *Knowledge* to do this job safely?
Do I have all the proper *Tools* and *Personal* protective equipment?

ACT to ensure safe operations!
Take necessary *Action* to ensure the job is done safely!
Follow written procedures! Ask for assistance, if needed!

DO NOT PROCEED UNLESS EVERYTHING IS SAFE!

For Everyone • Every Day • All the Time

DEFINITION: Hot work is work capable of providing an ignition source where flammable materials, combustible gas-air mixtures, or combustible vapors are present or may be released to create a potential fire or explosion hazard.

An ignition source is defined as any fire or spark producing activity, component or piece of equipment. Ignition sources include, but are not limited to, work requiring the use of: power tools, welding equipment, portable grinders, operating internal combustion engines (e.g. vehicles), concrete cutters, heavy equipment operations (e.g. backhoes, drill rigs), vacuum truck operations, or any other flame or spark-producing equipment, tools or procedures.

Examples of hot work activities that require permitting:

- 10 feet (3 meters) distance from furthest edge of any known or suspected tank, pump(s) and pump galleries, manifolds, production wells, loading racks and any other process equipment types containing flammable/combustible materials, gas-air mixtures or vapors.
- 10 feet (3 meters) distance surrounding dispenser islands at retail sites.
- The entire area between the tank field and dispenser islands at retail sites.
- 10 feet (3 meters) distance from other known or suspected subsurface structures containing flammable materials, combustible gas-air mixtures or combustible vapors.

KEY RESPONSIBILITIES OF PERMIT ISSUER:

Authorization -- Before cutting or welding is permitted, the area shall be inspected by the individual responsible for authorizing the cutting and welding operations. He/she shall designate precautions to be followed in granting authorization to proceed utilizing the written permit.

The Permit Issuer must work with the Permit Recipient to ensure that the area is properly prepared for hot work. Specifically, the Issuer must ensure that the following work is completed:

Equipment is cleared and blinded
Ignitable trash is removed from the area (35')
Adequate fire-fighting equipment is provided
Precautions taken for overhead hot work
Provide a safe location for welding equipment
Flammable material is not spilled or released from equipment
Sewers are covered and sealed
Hot work area is safe from flammable discharges from adjacent areas
Gas detection for initial and continuous monitoring
Check other work being performed in the area

KEY RESPONSIBILITIES OF PERMIT RECIPIENT:

- Ensuring that only the type of work covered by the permit is performed.
- Ensuring that conditions at the job site are safe for the scheduled work and that hot work is confined to the area covered by the permit.
- Assuring that the proper gas tests have been satisfactorily completed.

Any welding, burning or use of equipment causing sparks or heating shall be stopped at least 30 minutes before permit closeout to allow for inspection of the work area.

KEY RESPONSIBILITIES OF THE FIRE WATCH:

- A fire watch shall be required whenever welding or cutting is performed in locations where a fire might develop, or any of the following conditions exist:
  - Combustible material, in building construction or contents, closer than 35 feet to the point of operation.
  - Combustibles are more than 35 feet away but are easily ignited by sparks.
  - Wall or floor openings within a 35-foot radius expose combustible material in adjacent areas including concealed spaces in walls or floors.
  - Combustible materials are adjacent to the opposite side of metal partitions, walls, ceilings, or roofs and are likely to be ignited by conduction or radiation.
- A person performing fire watch shall have fire extinguishing equipment readily available and be trained in its use. They shall be familiar with facilities for sounding an alarm in the event of a fire. They shall watch for fires in all exposed areas, try to extinguish them only when obviously within the capacity of the equipment available, or otherwise sound the alarm. A fire watch shall be maintained for at least a half hour after completion of welding or cutting operations to detect and extinguish possible smoldering fires.

Required Fire Fighting Equipment -

- When welding or cutting activities require a Fire Watch, at least two fully-charged 20 lb. Dry Chemical fire extinguishers, an approved and functional Combustible Gas Indicator, welding shields (if exposure exists to adjacent personnel or the public), should be at the work site.
- All other Hot Work activities require a minimum of at least one fully-charged, sealed and currently inspected 20-lb Dry Chemical fire extinguisher.
- Firefighting equipment must be adequate for the type of combustible materials in the area and provide adequate coverage.

The following Gas Detection Guidelines shall apply when issuing permits with project-specific PELs and testing methods based on local country requirements and potential chemical/gas exposure.

- Oxygen

23.5% **maximum** for entry and hot work.
19.5% **minimum** for entry without supplied breathing air. (Some facilities may not allow entry regardless of supplied breathing air until oxygen is 19.5% minimum to 23.5% maximum.)

- Lower Explosive Limit (LEL)

5% **maximum** LEL for entry without breathing air.
10% **maximum** LEL for routine entry procedures. 10% to 20% requires rescue special procedures to be implemented. **No entry above 20%.**
1% **maximum** LEL for hot work. Some sites may establish a limit of 0% until the source is determined.

- Permissible Exposure Limits (PEL's) for use without respirators (see MSDS, all values are **maximums**)
- Exceeding **ANY** maximum value requires use of respirators

NOTE: A nitrogen-enriched environment, which depletes oxygen, can be detected only with special instruments. High concentrations of N2 become particularly dangerous because workers may not be able to recognize physical or mental symptoms of overexposure, leading to asphyxiation.

(NOTE: region-specific concentration limits may be lower)

To ensure proper documentation and retention of the required gas testing, readings must be recorded on this document in the space provided below.

GAS TEST REQUIRED	**o Yes o No**	**RECORD CONTINUOUS MONITORING EVERY TWO HOURS**	**TESTORS INITIALS:**											
CHEMICAL	NO RESPIRATOR REQUIRED	NO ROUTINE WORK PERMITTED	CONTINUOUS MONITORING REQUIRED	RESULT / TIME		RESULT / TIME		RESULT / TIME		RESULT / TIME		RESULT / TIME		RESULT / TIME	
Oxygen	>19.5% to 23.5%	<19.5% OR >23.5%	o Yes o No												
%LEL (entry)	See Total Hydrocarbons	> 5 % LEL	o Yes o No												
%LEL (hot work)	See Total Hydrocarbons	> 1% LEL	o Yes o No												
Benzene	<0.5 ppm	≥500 ppm	o Yes o No												
Hydrogen Sulfide	≤10 ppm	≥100 ppm	o Yes o No												
Total Hydrocarbons	<100ppm	≥1,000 ppm	o Yes o No												
Other:	See MSDS	IDLH see MSDS	o Yes o No												
Other:	See MSDS	IDLH see MSDS	o Yes o No												
Other:	See MSDS	IDLH see MSDS	o Yes o No												

DEFINITION: Confined space is an enclosed or partially enclosed space/structure that: (1) Is large enough and configured in a way that allows a person to bodily enter and perform work; and (2) Has limited or restricted means for entry or exit (e.g. tanks, vessels, silos, storage bins, hoppers, vaults, sewers, pits building crawl spaces and excavations that are greater than four feet in depth); and (3) Is not designed for continuous employee occupancy.

Confined space entry that requires a work permit is entry into a confined space with one or more of the following characteristics: 1) contains or has a potential to contain a hazardous atmosphere that cannot be eliminated (e.g. through continuous forced air ventilation) for safe entry throughout the duration of confined space entry with sufficient monitoring and documentation to confirm continuous non-hazardous atmosphere; 2) contains a material with the potential to engulf someone who enters the space; 3) has an internal configuration that might cause an entrant to be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or 4) contains any other recognized serious safety or health hazards.

Any person required or permitted to pre-check or enter a confined space shall have received approval of the Permit Issuer and/or Recipient and successfully completed all training required by regulatory authorities (e.g. OSHA CFR 1910.146). A written copy of operating and rescue procedures as required by these procedures shall be at the work site for the duration of the job. **All personnel entering a confined space must sign in and out utilizing the EMGR Work Permit Signature Page.**

Confined space work sites must be labeled: **"DANGER - PERMIT REQUIRED CONFINED SPACE. DO NOT ENTER"**

The Confined Space Pre-Entry CheckList (below) must be completed by the Permit Issuer and the Entry Supervisor must sign w before entry into a confined space. If circumstances dictate an interruption in the work, the permit space must be re-evaluated and a new checklist must be completed. *The practice of maintaining "no standby individual or on site rescue" shall only be exercised at an excavation site which poses no atmospheric hazards or potential hazards, and where no other defined hazard has the potential to exist. Confined space entry into storage tanks and other locations meeting the definition of a confined space will continue to require an Entry Supervisor and a Standby person even if no atmospheric or other hazards are present.*

The following Gas Detection Guidelines shall apply when issuing permits with project-specific PELs and testing methods based on local country requirements and potential chemical/gas exposure.

- Oxygen

23.5% **maximum** for entry and hot work.
19.5% **minimum** for entry without supplied breathing air. (Some facilities may not allow entry regardless of supplied breathing air until oxygen is 19.5% minimum to 23.5% maximum.)

- Lower Explosive Limit (LEL)

5% **maximum** LEL for entry without breathing air.
10% **maximum** LEL for routine entry procedures. 10% to 20% requires rescue special procedures to be implemented. **No entry above 20%.**
1% **maximum** LEL for hot work. Some sites may establish a limit of 0% until the source is determined.

- Permissible Exposure Limits (PEL's) for use without respirators (see MSDS, all values are **maximums**)
- Exceeding **ANY** maximum value requires use of respirators

NOTE: A nitrogen-enriched environment, which depletes oxygen, can be detected only with special instruments. High concentrations of N2 become particularly dangerous because workers may not be able to recognize physical or mental symptoms of overexposure, leading to asphyxiation.

(NOTE: region-specific concentration limits may be lower)

To ensure proper documentation and retention of the required gas testing, readings must be recorded on this document in the space provided below.

GAS TEST REQUIRED	**o Yes o No**	**RECORD CONTINUOUS MONITORING EVERY TWO HOURS**										**TESTORS INITIALS:**	
CHEMICAL	NO RESPIRATOR REQUIRED	NO ROUTINE WORK PERMITTED	CONTINUOUS MONITORING REQUIRED	RESULT / TIME		RESULT / TIME		RESULT / TIME		RESULT / TIME		RESULT / TIME		RESULT / TIME	
Oxygen	>19.5% to 23.5%	<19.5% OR >23.5%	o Yes o No												
%LEL (entry)	See Total Hydrocarbons	> 5 % LEL	o Yes o No												
%LEL (hot work)	See Total Hydrocarbons	> 1% LEL	o Yes o No												
Benzene	<0.5 ppm	≥500 ppm	o Yes o No												
Hydrogen Sulfide	≤10 ppm	≥100 ppm	o Yes o No												
Total Hydrocarbons	<100ppm	≥1,000 ppm	o Yes o No												
Other:	See MSDS	IDLH see MSDS	o Yes o No												
Other:	See MSDS	IDLH see MSDS	o Yes o No												
Other:	See MSDS	IDLH see MSDS	o Yes o No												

Name(s) of Entry Supervisor/Lead Worker:			
Name(s) of Stand-By Personnel:			
Name(s) of Authorized Entrants:			

CONFINED SPACE PRE-ENTRY CHECKLIST:

1. Atmospheric Check (after isolation and Ventilation) completed & recorded, and indicates no atmospheric hazard exist.	o Yes o No o NA
2. Equipment Isolation Confirmed (pumps and/or lines blinded, disconnected, or blocked)?	o Yes o No o NA
3. Ventilation: o Mechanical o Natural Ventilation only	o Yes o No o NA
4. Has the surrounding area been surveyed to avoid hazards from drifting vapors, engulfment ?	o Yes o No o NA
5. Arrangements for continuous monitoring of the atmosphere have been made and will be recorded above.	o Yes o No o NA
6. Communication procedures indicated on front and tested?	o Yes o No o NA
7. Rescue procedures indicated on front:	
8. Entry, standby, back up and gas testing persons successfully completed required training? Is it current?	o Yes o No o NA
9. Indicate On Site Equipment permit required and verified: o Safety harnesses and lifelines for entry and standby persons o Hoisting equipment o SCBA's for entry and standby persons o First Aid & CPR kit o All electric equipment listed Class I, Division I, Group D and Non-sparking tools o Direct reading gas monitor tested & indicated on front o Protective Clothing indicated on front o Powered communications	o Yes o No o NA

I have reviewed the work authorized by this permit and the information contained here-in. Written instructions and safety procedures have been communicated and are understood. Entry cannot be approved if any squares are marked in the "No" column. This permit is not valid unless all appropriate items are completed.
Approved by Entry Supervisor: _____ Date:____/___/____ Time: _____

Public Utility Companies (or Locator Service) Contacted on Date(s): _____

Confirmation Number(s): _____

☐ Place a check in this box ONLY if this is an emergency excavation and this permit is not subject to pre-notification requirements for underground utility locates. NOTE: Public Utility Companies and/or Locator Services must be notified within region-specific timeframe for conducting mark-outs.

DEFINITION: Excavation is any man-made cut, cavity, trench, or depression in the earth surface formed by soil removal.

If personnel will be entering excavation meeting the definition of Confined Space, a Confined Space Entry Permit must also be issued.

The possibility of encountering subsurface structures (including tanks and pipe, water, gas, electrical service lines, etc.) and their approximate location shall be determined by completing all GR Subsurface Clearance Protocol (SCP) requirements prior to start of site excavation work. If any warning signs or suspicious conditions that may indicate the presence of a subsurface structure, as noted in the SCP, are encountered during excavation activities, work in area should immediately stop and the EM PM must be contacted to discuss prior to proceeding.

Excavations greater than 6 meters (20 feet) in depth require design by a registered Professional Engineer, or country equivalent, for any sloping, shielding or shoring.

KEY RESPONSIBILITIES OF PERMIT ISSUER:
- Confirm the location of subsurface structures.
- Ensure the installation and use of required benching, sloping, shoring or shielding methods.
- Identify required excavation inspection schedule and personnel.

KEY RESPONSIBILITIES OF PERMIT RECIPIENT:
- Conduct site walk with excavation personnel to show locations of previously identified subsurface structures.

The following Gas Detection Guidelines shall apply when issuing permits with project-specific PELs and testing methods based on local country requirements and potential chemical/gas exposure.

- Oxygen

23.5% **maximum** for entry and hot work.
19.5% **minimum** for entry without supplied breathing air. (Some facilities may not allow entry regardless of supplied breathing air until oxygen is 19.5% minimum to 23.5% maximum.)

- Lower Explosive Limit (LEL)

5% **maximum** LEL for entry without breathing air.
10% **maximum** LEL for routine entry procedures. 10% to 20% requires rescue special procedures to be implemented. **No entry above 20%.**
1% **maximum** LEL for hot work. Some sites may establish a limit of 0% until the source is determined.

- Permissible Exposure Limits (PEL's) for use without respirators (see MSDS, all values are **maximums**)
- Exceeding **ANY** maximum value requires use of respirators

NOTE: A nitrogen-enriched environment, which depletes oxygen, can be detected only with special instruments. High concentrations of N2 become particularly dangerous because workers may not be able to recognize physical or mental symptoms of overexposure, leading to asphyxiation.

The following gas detection guidelines shall apply when issuing permits for project activities with potential for exposure to hazardous environment. Project-specific exposure limits (e.g. PELs, STELs, TWAs) and testing methods must also be based on MSDS and local region requirements.

(NOTE: region-specific concentration limits may be lower)

To ensure proper documentation and retention of the required gas testing, readings must be recorded on this document in the space provided below.

GAS TEST REQUIRED	**o Yes o No**	**RECORD CONTINUOUS MONITORING EVERY TWO HOURS**	**TESTORS INITIALS:**											
CHEMICAL	NO RESPIRATOR REQUIRED	NO ROUTINE WORK PERMITTED	CONTINUOUS MONITORING REQUIRED	RESULT / TIME		RESULT / TIME		RESULT / TIME		RESULT / TIME		RESULT / TIME		RESULT / TIME	
Oxygen	>19.5% to 23.5%	<19.5% OR >23.5%	o Yes o No												
%LEL (entry)	See Total Hydrocarbons	> 5 % LEL	o Yes o No												
%LEL (hot work)	See Total Hydrocarbons	> 1% LEL	o Yes o No												
Benzene	<0.5 ppm	≥500 ppm	o Yes o No												
Hydrogen Sulfide	≤10 ppm	≥100 ppm	o Yes o No												
Total Hydrocarbons	<100ppm	≥1,000 ppm	o Yes o No												
Other:	See MSDS	IDLH see MSDS	o Yes o No												

EXCAVATION CHECKLIST:

1.	Subsurface Structures Identified and Mark-Out Locations Shown to GR Project Site Workers?	o Yes o No
2.	Overhead Utility Lines and Minimum Clearance Requirements Reviewed with GR Project Site Workers?	o Yes o No
3.	Hand/Mechanical Communication Methods Established with Equipment Operators and Other GR Project Site Workers?	o Yes o No
4.	Excavation Inspection Schedule Established	o Yes o No o NA
5.	Exposed Subsurface Structures Protected or Supported?	o Yes o No o NA
6.	Appropriate Warnings Signs and Barricades Have Been Installed to Protect GR Project Site Workers and Establish Work Zone (to a distance equivalent to the angle of repose of the soil or minimum of 3 meters)?	o Yes o No
7.	Support Systems (e.g. shoring, bracing or other means of stabilizing the excavation) Have Been Installed to Protect Adjacent Roadways, Buildings, Walls, Sidewalks, Pavements and Other Aboveground Structures?	o Yes o No o NA
8.	Prior to Leaving Excavation Unattended, Appropriate Warning Signs and Barricades Have Been Installed to Protect Pedestrians and Vehicular Traffic (e.g. vehicular traffic areas require steel road plates; pedestrian traffic areas require high security fencing, cyclone wire mesh or equivalent; low lighting areas require barricades with flashing warning lights)	o Yes o No o NA

I have reviewed the work authorized by this permit and confirmed subsurface structure mark-outs have been completed and discussed with GR Project Site Workers.

Permit Recipient: _____ Date:_____ Time: _____

Nobody Gets Hurt

Record personnel involved in the permit activities.

I have read and understand all conditions specified on the authorized permit referenced above.

Name	Company	Time In	Initials	Time Out	Initials

Nobody Gets Hurt